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The Laws Determining Casting or Fusing Results, Their Control, and a New and Rational Technique.

By WESTON A. PRICE, D.D.S., Cleveland, Ohio.

The size and shape of the mold or the cavity in the heated homogeneous investment will change in proportion to the change in the exterior dimensions and in the same direction, provided the heating is uniform and not too rapid and all walls thick enough in proportion to their area to prevent warping from too rapid heating. I have spoken of "homogeneous investments," which condition is not always produced, and a misleading error is thus introduced. For example, when a thin mix is painted around the wax model first, and a thicker mix, or a different preparation, is placed outside of it and heated, we have not a homogeneous mass. The outer layer of the investment expands more than the inner, forming a seam between them, and when the molten metal is forced into it the pressure bursts the inner investment, forcing it out against the outer one and enlarging the mold, though not uniformly, because of the position of the fractures. In this case the inner mix may be one that actually contracted on heating, and the mold diminished in size, but by bursting it in this way the inlay is enlarged. This condition will always show fans, or seams, of gold extending outward from the cast, and such castings are distorted. It may happen that the adhesion of the outer layer of investment to the inner layer will be sufficient to

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carry it with it on heating and expanding, in which case the mold is enlarged before the gold goes into it, but the mold will crack and show fans on the side of the cast. These are not exceptions to the law as stated, but are fulfilments of it under different and wrong conditions.

Knowing that many have been misled by such conditions as the above, and by lack of exact measurements, and think that if the investment expands the cavity or mold will be smaller, and *vice versa*, the writer has carefully tested the practical exactness of the data submitted.

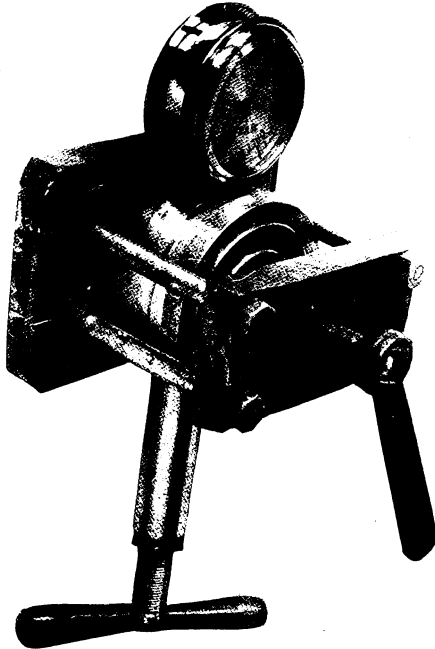
According to the statement of the writer we can in part correct the contraction of the gold by expanding the investment, thereby enlarging the mold for the reception of the gold, and according to our figures if we use an actual pressure on the casting inlay of about one-sixth of a pound, we would expect to reduce the normal contraction of a 24 karat gold bar one inch in length from about 22 thousandths, when fused without any pressure, to about 15.5 thousandths of an inch if cast into an investment or chamber whose size did not change with the heat. (See May ITEMS OF INTEREST.) If all conditions are the same except that the investment is one that expands we would expect from the data submitted for example with Peck's at 900 degrees Fahrenheit (see chart in May ITEMS OF INTEREST), to reduce this contraction 7.2 thousandths per inch, or to 8.3 total contraction. Of if a similar bar be cast with all conditions the same except that the investing material contract we would expect with a thin mix of plaster heated to 1000 degrees (see chart) to add to the total contraction 6.5 thousands, because at that temperature that material shows a contraction of that extent per inch from its starting point, or a total of about 22 thousandths.

Test Experiments.

After having this point raised several times, the writer cast bars under precisely the above three conditions with the following results: First, two bars were cast into a fused quartz chamber at the same pressure and temperature, and each showed a contraction of precisely 15.1 thousandths per inch, which was estimated to be 15.5 thousandths. The bar cast into Peck's at about 900 degrees contracted 7.5 thousandths, which we estimated would be 8.3 thousandths, and the bar cast into the thin plaster contracted 21.1 thousandths, which we estimated to be 22 thousandths. All bars are within a thousandth of an inch of their estimated length. If, as some suppose, the expansion of the investment contracts the mold, the bar cast into Peck's investment at 900 degrees should have shown 7 or 8 thousandths of an inch greater contraction than the bar cast into the fused quartz chamber, which it did not, and likewise the greatly contracting investment of thinly mixed plaster should have shown less total contraction by about 6 thousandths, but it showed

6.5 thousandths of an inch more, thus proving not only the general statement of expansion of mold with investment but also the correctness of the figures published.

For fear this might not be intelligible and conclusive to all, the writer made in addition the following tests, which reproduce the condi-



tions quite exactly on a large scale. A fused quartz cylinder 1.567 inches in diameter was used because of its relatively constant dimensions irrespective of temperature (its expansion is less than one thousandth for 2000 degrees Fahrenheit) and surrounded first by an investment of thinly mixed plaster and allowed to set and then heated. At first the quartz cylinder loosened, then tightened, and the investment burst, opening a wide crack. After being heated to about 1000 degrees and allowed to cool the quartz was removed and the diameter of the contracted opening taken. According to the figures in the chart we should have a total reduction of the diameter of this opening of twenty-four thousandths per inch after the heated plaster had cooled. The measurement was taken in two ways, first with a delicate, fine reading micrometer, and second by measuring the width of the crack with the cylinder in place and com-

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puting the diameter change. The direct method showed a contraction of the opening of 20.4 thousandths per inch, and the latter method 21.6, both of which are very close to the contraction estimated, and though small this difference is almost entirely accounted for by the fact that the investment was not entirely cooled when measured, but was probably two or three hundred degrees hot, which would give it two or three thousandths less total contraction.

Another huge reproduction of an inlay investment and mold was constructed in the same manner, but with a mixture around the fused quartz cylinder that was known to expand 10.1 thousandths at 800 degrees Fahrenheit. At about two or three hundred degrees the cylinder loosened, and at 800 degrees was so loose it could be rattled around in the mold. At this point the dimension was taken, and showed an expansion of 9.5 thousandths per inch, almost precisely as estimated, *viz.*, 10.1, again proving conclusively the correctness both of the general statement and also the figures in the chart. If the reader will think of the everyday practice of heating a wagon tire to get it on the wheel, or of heating a glass bottle neck to loosen the stopper, he can easily apply it to the condition in hand by imagining, for example, a hundred or a thousand iron tires each inside the other and all heated, when the effect would be the same on the inside one as the outside one. All homogeneous substances obey this same law.

Artificial Stone.

The artificial stone can be used precisely as plaster or any cement, and does not require to be set under pressure any more than they do, and if plaster or any model material or investing material is set under pressure, the air bubble deformities are very greatly or entirely prevented. The illustration shows the press which the writer has designed for his use, which can be modified to any form, but must be very strong.

The artificial stone model material can be set in two minutes by heating, and then immediately raised to a temperature above melting gold. The writer is endeavoring to cheapen its manufacture, and thereby its cost, to a point where it can be used for all model construction if desired.

For verification of the stated laws of physics and their application, the writer refers to any standard work on advanced physics, because the principles here stated and formulas used are the alphabet of applied physics. We also wish to acknowledge the good service rendered by Prof. Dayton C. Miller, head of the department of physics of Case School of Applied Science, who has looked carefully over the methods of research and the application of physical formulas, and has endorsed them.

Centrifugal Casting Machines.

By C. F. KABELL, D.D.S.

A Reply to Dr. Price's Article in May ITEMS OF INTEREST.

Several things puzzled me after reading Dr. Price's article. Does he invest his artificial stone model in the same artificial stone for casting, and how is he going to get out the inlay without endangering the shape?

If he, on the other hand, uses, for example, Dr. Taggart's Investment Compound, how will this withstand a pressure as high as he mentioned? He also must use a sprue of average dimensions. It would otherwise destroy too much of the contour of the inlay.

When one considers that steam boilers only stand 200 to 250 pounds pressure to the square inch, how could a simple weak plaster pipe stand a pressure again as high? As this is impossible, Dr. Price's calculations must be wrong regarding the centrifugal force.

Centrifugal machines are used in the sugar refineries, laundries, etc., to separate liquids from solids. In these machines the centrifugal force is used to press the contained water or other liquids out of the solids, because the centripetal force, the holding force, can only have a limited power on the liquid through the liquid's adhesion to the solid and a friction on the walls of the drum.

As soon as the momentum attained by the mass is greater than this adhesion and friction, the water will fly out at right angles to the radius or, as the centrifugal force works in the direction of a continuation of the radius, the liquid is thrown out at right angles and to the right of the centrifugal force.

Knowing this, is it not rather odd that a centrifugal casting machine, working on the same mechanical lines, throws liquid into a solid (if I may term the investment such).

As it is impossible to find out by ocular inspection, let us theoretically figure out the parts relating to a machine built after the description of Dr. Price.

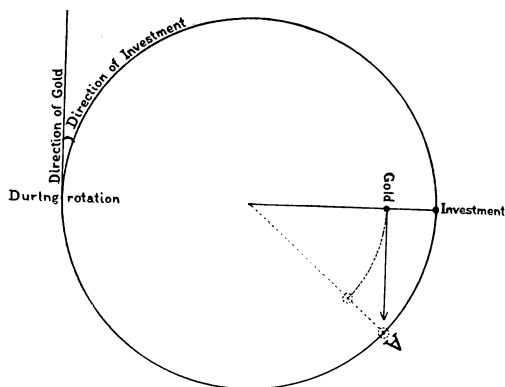
He rotates a crucible containing molten gold, which stands presumably at vertical right angle to the radius, the investment superimposed so that when the crucible is tipped, the investment will protrude outward as a direct elongation of the radius and will then be in direct line to the centrifugal force.

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Supposing this machine rotates at the moment of tipping—twenty revolutions per second on a radius of six inches, the molten gold will have an initial velocity of $\frac{12 \times 3.14 \times 20}{12} = 62.8$ feet per second.

At the moment the machine tips the cavity in the investment will be seven inches away from the center, therefore rotating on a radius of seven inches, with initial velocity of 73.13 feet per second.

When the crucible is tipped the centripetal force which was exerted on the gold, it being contained in a securely fastened receptacle, is taken



away from the gold. Now the gold will only follow its momentum and flies away at right angle to the radius and the sprue and would certainly not hit the investment at all if the latter had no motion.

But the investment moves and travels faster than the gold, so that it would be at "A" (see illustration) sooner than the gold, so that the investment has to be a little to the left of the radius. (*The exact place can be determined, but here not necessary.*)

Now then! The gold traveling at a rate of 62.8 feet is met from behind and at an angle of 20 degrees by a superior force of 73.13 feet velocity, and will, therefore, with the difference of the two speeds with 10.37 feet velocity press against the investment, but at an angle of 20 degrees. This angle is but a glancing blow, and if molten gold at a velocity of 10.37 and of $\frac{1}{2}$ ounce weight would exert a direct pressure of 0.14 pounds, this will have to be divided by $2/9 = 0.031$ pounds pressure.

These figures apply to the instant of the gold hitting the investment. During the rotation the following figures hold good.

The investment now containing the molten gold having a velocity of 73.13 feet, transmits the same speed to the gold, and the latter tries at all times to fly away at a right angle to the radius and the direction of the sprue.

The investment following the curve of the circle presses laterally against this at the same speed, and the amount of lateral pressure can be determined by figuring the angle made between a tangent and the curvature of the circle, which angle will be the greater the smaller the radius, and you will find the pound pressure by dividing 73.13 by the angle of, we say, one degree. That means by ninety.

I can not mention here all the physical laws which apply to this, and hope dentists will polish up their knowledge to find out the explanation themselves.

This special problem does not seem to have had the attention of physicists, and the law for this special case must read: The centrifugal force exerted by liquids contained in receptacles is equal to the velocity divided by the angle formed by a tangent and the curvature of the prescribed circle plus friction.

"A New Specialty."

By DR. A. W. THORNTON, Chatham, Ont.

There can be no doubt that the tendency of the times, in dentistry, as in other professions, is toward "specializing." A few years ago a man who practiced dentistry was supposed to treat all lesions of the teeth. Now we have specialists in crown and bridge work, in orthodontia, in porcelain work, in the treatment of pyorrhea, in extracting, etc.

In our colleges men who have given special thought or study to any of these subjects are employed to teach them to the students. The question evidently in the minds of the college authorities is not "Can he teach?" but "Does he know the subject?"

Trained Teachers Needed.

It is true, of course, that a man can not teach what he does not know; it is equally true that vast numbers of persons can not teach what they do know.

Any man who can teach may obtain a knowledge of a subject, but a man with a good knowledge of a subject may

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possibly never be able to teach it. A short time ago a very thoughtful man said to me, "Teachers, like poets, are born, not made." That statement may not be altogether true, but certainly it is true that "teaching," as much as law or medicine or theology, is a "business" and must be learned.

How ridiculous then does the idea appear that because a man has good mechanical ability, or possesses a mind given to original research; that necessarily that man can successfully teach the subject in which he is interested. Is it not more rational to suppose that a trained teacher can acquire the knowledge of the investigator from the published results of the investigation, and successfully present the facts to the student body?

Much thought has recently been given to orthodontia, to porcelain, to crown and bridge work. How much thought has been given to the "student" who must grapple with these subjects in our colleges? The late Professor Hamilton (astronomer royal of Ireland) printed on the title page of one of his books:

"There is nothing great in universe but man.
There is nothing great in man but mind."

If that be true (and who will doubt it) are we not guilty, in all our colleges, of sacrificing that which is of paramount importance on the altar of that which is of infinitely less importance?

Is gold, or porcelain, or dollars of greater value than men? Is dentistry of greater value than citizenship? Is ability to put in a beautifully contoured filling of greater value than moral integrity? Is the knowledge of cavity preparation more to be desired than ability to know and to see and to appreciate the beautiful in life? Is that which is gross and material and temporal of greater value than that which is mental and spiritual and eternal? Are *things* of greater value than *men*?

Surely—surely—not.

Possibly some one will say, "A dental college is for the teaching of dentistry." True, and my reply is, "These things ought ye to do, and not leave the other undone."

Is there not room in all our colleges for "specialists" in teaching; specialists, not because they know more than any one else about their subject, but specialists because they have studied *men*, and how to teach them, and how to reach them, and how to influence them for good?

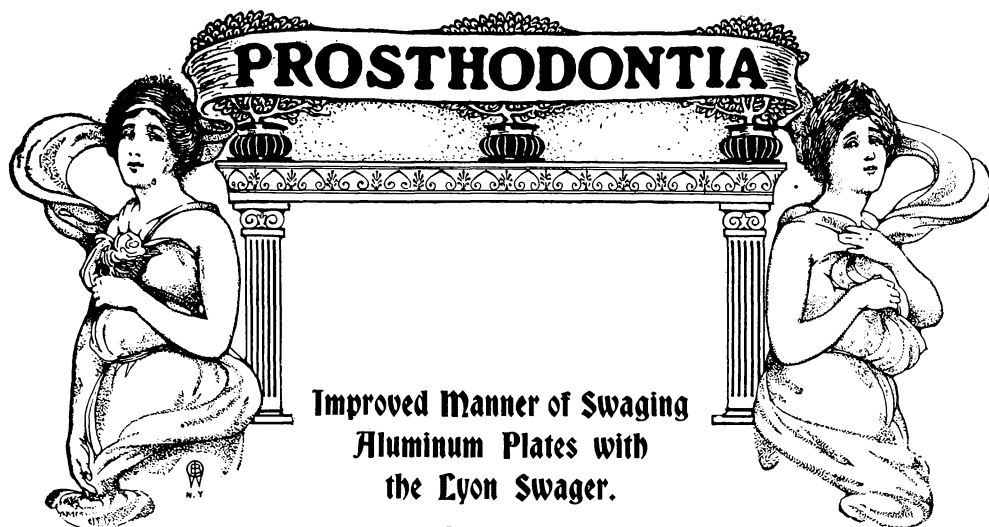
The new "specialty" to which I refer is "teaching and reaching students," and I trust that a great number of such "specialists" may

enter the field of dentistry, for through the channel of "specialists," such as I have named, and only through such channels, will dentistry attain to that status for which we have looked and longed.

The annual announcements of all our colleges contain the statement that "students presenting themselves for graduation must be persons of good moral character." What does that mean? Anything more than that the student must not be in jail at the time of the graduating exercises? What effort is made to ascertain the moral status of a student before he is entered on the college register, or what effort is made to inculcate or develop moral character during the college term?

Who can estimate the influence, either for good or evil, which a teacher in a college exerts on the student body? Surely we might reasonably expect that the students should leave the college with higher ideals and loftier aspirations than they possessed in entering. But how much thought is given to this idea of "better citizenship." I know full well that no lecturer has any right to use his time, or his position as a lecturer, to "preach" or talk "goody-goody" talk; but there are hundreds of opportunities to impress upon the student's mind that "it is not all of life to live," that "mind is the measure of the man," that "he lives most who thinks most and acts the noblest," that "it is noble to be good." To do this "a new specialty" is required.





By W. T. WALLACE, D.D.S., Henderson, N. C.

First procure a Lyon swager, and get an extra casting block; then use for the impression one-half fine plaster, one-fourth pulverized pumice and one-fourth whiting, which should be compounded together in a four pound lot, thoroughly incorporated in a dry state, and which will then be ready for use at any time.

Take the impression and invert it properly in the base block of the swager directly over the depression, then build up closely on the block around the edge of the impression with the impression material. Warm casting block and impression thoroughly by placing on stove or slow flame until it is almost as hot as the melted die metal. Melt the fusible metal in a ladle which will hold 8 ounces or more, and pour in the impression. Wait a few minutes and separate and place impression on the other casting block, and treat in same manner as the first. You now have two good dies—one to conform the plate to fit reasonably well, and reserving a good sharp die for final swaging, thereby securing a close adaptation.

For convenience I always have several swaged plates of various sizes and shapes on hand from which I can always find one to conform so closely to the case that a few taps of a horn mallet will force it up snugly to the die. Anneal the plate until it will char pine wood, but avoid overheating, as it would make a porous plate.

After annealing and cooling the plate it should be placed in the swager with a sheet of rubber dam over the plate to prevent the counter

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die material from being forced under the plate, and to make it separate more easily. The cup of the swager is then half or more filled with unvulcanized rubber; place the follower of the swager in position, then place in the press and turn the lower wheel until the follower is clear down on the casting block, which will throw the excess of rubber up through the small opening in the upper section of the swager. Then apply pressure to the upper wheel and swage to place; release the pressure and remove and trim the plate properly, then anneal the plate and place it on new die and return to swager for final swaging, which will result in a perfect fit of the gums in case the impression was right and the die properly scraped to insure good bearing. You will now want to thoroughly clean the plate with a strong solution of caustic soda and rinse well and try in the mouth; if it fits well, the next step is to place warm bee's wax on the plate and get the correct articulation of the mouth. The plate should rest on the die while adjusting the wax so as to retain its perfect fit to the mouth.

The time for getting the work thus far along need not consume more than an hour, and patients from a distance can wait for the wax bite. With the Lyon swager the work is shortened so much that an aluminum plate with rubber attachment can be made with the same ease as an ordinary rubber plate—while an aluminum plate is far better than a rubber plate for the following reasons: It makes a stronger and thinner plate, and is an excellent conductor of heat, and is a very agreeable and healthy base. Aluminum for plates should be 20 to 26 gauge, according to size and width of the gums; 20 gauge for broad mouths and 26 for very small mouths or gums, is better than to have the plates too thin for large broad models. The metal must be strong and also fuse readily, and should neither expand nor contract much.

Formulas for Die Metal.

I find the following metals, compounded properly, answer very well for dies: Bismuth, 3 parts; tin, 1 part; lead, 1 part; cadmium, $\frac{1}{4}$ part; also, bismuth, 3 parts; tin, 5 parts; lead, 3 parts; cadmium, 1 part.

The first formula is more fusible than the second, and should be used for the final swaging, so that in case of undercuts it can be melted from the plate by boiling in glycerin. The second formula is less expensive, and can be used to strike up plates and get them ready for the final swaging. The metals should be kept in separate boxes and proportions labeled.

In conclusion I would say, take a medium sized model and make an aluminum upper plate, using a set of Consolidated Dental Mfg. Co.'s plain



teeth, mold No. 92, and you will have a beautiful sample set in case you use Perfection Pink Rubber.

The Lyon swager has a power of fifteen tons pressure, and must be strongly bolted to a solid workbench; the bench must not move, as good results can not be accomplished on a table that is movable.

Improved Forms of Artificial Teeth.

Editor ITEMS OF INTEREST.

Dear Sir—At the February meeting of the First District Dental Society of South Dakota the subject of “improved forms of artificial teeth” was thoroughly discussed by the members present.

By unanimous vote the secretary was directed to send you a letter advocating and indorsing Dr. Williams’s views on the improvement of forms of artificial teeth.

The following dentists constituting the society wish to lend their hearty support to such an improvement:

Dr. W. S. Sargent, Gettsburg, S. D.; Dr. W. S. Kyes, Parker, S. D.; Dr. G. J. Farmenack, Parker, S. D.; Dr. J. W. Smoots, Beresford, S. D.; Dr. S. Headly, Centerville, S. D.; Dr. V. E. O’Niel, Canton, S. D.; Dr. W. W. Price, Centerville, S. D.; Dr. G. W. Collins, Vermilion, S. D.; Dr. C. Rosteascher, Yankton, S. D.; Dr. G. E. Matheson, Ireton, Iowa; Dr. J. S. Opland, Beresford, S. D.; Dr. R. S. Tower, Yankton, S. D.; Dr. W. S. Cornish, Alton, Iowa; Dr. B. M. Banton, Yankton, S. D.; Dr. E. M. Valentine, Yankton, S. D.; Dr. W. M. McDonald, Elk Point, S. D.; Dr. W. F. Price, Vermilion, S. D.; Dr. J. L. Martin, Vermilion, S. D.; Dr. O. K. Williams, Springfield, S. D.; Dr. Robinson, Tyndol, S. D.

Yours truly,

J. L. MARTIN, Secretary.

Vermilion, S. D.

Editor ITEMS OF INTEREST.

Dear Sir—Your editorial in the January number on the manufacture of artificial teeth meets my approval.

It certainly is difficult to get anything approaching perfect occlusion with the teeth as they are furnished to us by the manufacturer at the present day. I have spent hours in grinding and trying to get perfect occlusion. The morsal surfaces are too rounded and the sulci are ill defined. Not infrequently almost the entire morsal surface has to be

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ground away, removing the glaze and exposing a lot of small pits in the structure of the teeth, which furnishes excellent points for the retention of food debris and other germ breeding products.

I sincerely hope that Dr. Williams's cry for this much-needed reform will be taken up by the members of our profession and force the manufacturer to realize that molds approaching the natural teeth are what we want.

Very truly yours,

N. L. POLINGER.

21 East 118th St., New York.

Editor ITEMS OF INTEREST.

Dear Sir—I heartily indorse the movement for better teeth inaugurated by Dr. Williams. His plan is so reasonable and comprehensive that it needs no argument in its favor. The profession to-day needs better shaped teeth as much as anything.

Yours truly,

H. F. HOFFMAN.

Denver, Colo.

Editor ITEMS OF INTEREST.

Dear Sir—At the last meeting of the St. Louis Society of Dental Science a hearty indorsement of the efforts of Dr. J. Leon Williams to improve the forms of artificial teeth was voted, and he has been so informed.

The lack of individual expression of approval following the original communication of Dr. Williams may not have been due to disapproval or apathy, but to a feeling on the part of most of your readers that their opinion was not of sufficient importance to assert.

This reform in tooth manufacture is not being considered by the profession for the first time, and the views expressed by the members of this society show them to be enthusiastically in favor of improvement in this product.

Very truly yours,

CLARENCE O. SIMPSON, Secretary.

457 Century Building, St. Louis, Mo.



Double Resection for the Treatment of Mandibular Protrusion.

By MAX BALLIN, M.D., Detroit, Mich.

Read before the American Society of Orthodontists at Detroit.

Mr. H. A. M., a young man twenty-two years old, consulted me first on May 10, 1907, complaining about the protrusion of his lower jaw that caused him a great deal of trouble, and for which dental treatment, tried from early childhood to this day, had been of no avail. He was very much embarrassed by his deformity, mastication being practically impossible, and speaking being rendered very difficult. The knowledge of his deformity kept the young man from society and made him of rather melancholic disposition.

On examination I found an otherwise healthy young man, whose lower incisor teeth protruded to such extent that the distance between upper and lower incisors measured half an inch. The teeth were very defective; the incisors, two canines, one premolar and only one molar were present on the lower jaw. On the upper jaw the incisors, two canines and two molars were present. On the lower jaw there was a big defect between the premolar and the molar on each side. The alveolar process was quite atrophic at the place of this defect (see Fig. 1).

The teeth, the incisors especially, were grooved on their crowns, so-called Hutchinson teeth. There is nothing in the family history of the young man that can be made responsible for this condition of the teeth, the same probably being only due to non-use, caused by protrusion of the mandible. At first sight one can see that in this case, as in most

of the kind, the condition is due to sub-development of the maxilla; as you see the upper jaw is very small and the palate is very high. You also notice that the teeth are very sparingly developed in the upper jaw. as stated above, only twelve being present. The size of the mandible



FIGS. 1 AND 2.

FIG. 1.—Model taken from patient before operation. *a* and *b*, lines of resection.
 FIG. 2.—Model after operation.

must be considered normal. The development of the upper jaw has been arrested, and hence the protrusion of the mandible is due to sub-development of the maxilla.

Mainly on account of the melancholic disposition of the patient caused by his deformity, and also on account of practical reasons, masti-

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cation and speech being interfered with by the deformity, double plastic resection of the jaw was proposed and readily accepted. I consulted my friend, Dr. Jackson, a doctor of dentistry and medicine, who made the model and also fitted the necessary appliances to the teeth to keep the fragments of the jaw in good position after the operation. It is mainly due to the skill and valuable suggestions of Dr. Jackson that such good results have been accomplished in this case. Previous to the operation, Dr. Jackson cleaned the patient's teeth and fastened Angle's



FIG. 3.

FIG. 4.

FIGS. 3 and 4.—Photographs of patient before and after operation.

fracture clamps to the premolars and molars on both sides of the mandible; that is, to the teeth between which the resection of the mandible was to be made.

The Technique of the Operation.

The operation was performed on May 20, 1907, at Harper Hospital. Ether was administered and the incision made on the lower edge of the jaw. The soft parts were detached, and by means of a curved elevator the mucous membrane was peeled from the alveolar process without opening the oral cavity. Then a trapezoid shaped piece was resected from the mandible. The same was repeated on the other side of the jaw, so that practically on both sides the piece between molars and cuspids was removed (see Fig. 1). The base of the removed piece was somewhat larger than the apex; the base measured about half an



FIG. 5.

FIG. 5.—Radiogram before operation. The protrusion of the mandible reached over the photographic place; still the radiogram will give a good idea of the disproportion.

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inch. The anterior fragment was easily adapted to the posterior. Two drill holes were made in their lower edges, and the fragments were fastened together with silver wire. The wound was sutured. After this the union of the fragments was made more secure by wiring together the fracture clamps, which Dr. Jackson had applied. This last was the first hand of a surgeon which entered the oral cavity during the operation. Before this act the whole operation was performed outside of the mouth, great care being taken, as I have mentioned, not to penetrate the mucous membrane in detaching the soft parts and in sawing. As to the technique on the first side, I used a saw driven by an electric motor, the same as I use for trephining. On the other side I excised the piece with the old style chain saw, leading the same round the mandible with a Dechamps aneurysm needle. I must say that the second method is preferable. The chain saw method took two minutes, and the electric saw method much longer, and it was very hard to saw in straight lines. Besides this, the electric so-called ripsaw easily causes burning of the tissues.

The patient made an uneventful recovery, and left the hospital after about a week. The wound healed by first intention, and I can demonstrate to you the result on the gentleman himself, and by the accompanying pictures (see Figs. 1-5).

After the patient left the hospital it was seen that the lower and upper teeth would not come into contact. Again Dr. Jackson helped the young man through this trouble by grinding off the crowns of the molars. This, by the way, could have easily been detected before the operation with the aid of the X ray picture, which shows clearly that the lengths of the molars would prevent contact of the incisors, even after shortening of the mandible (see Fig. 5). This shows the importance of having a good X ray picture taken.

The result, as you see, is a very favorable one. The patient's facial expression is very much improved, and the young man, who formerly was shy and kept away from society, I am told, is now a favorite with young ladies.

In conclusion, I would like to mention a few points in the technique of this operation. In the first place strict asepsis should be a condition without which successful work is impossible. Therefore, opening of the oral cavity during the operation should not occur, as this would certainly lead to suppuration and non-union of the bones. In our case opening of the oral cavity was easily prevented, as we had no teeth to encounter at the point of resection, therefore, the mucosa over the alveolar process could be easily detached without injuring it. If the teeth are extracted

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during the operation, communication between the external incision and the extraction wound will always take place. I would recommend, therefore, to extract the teeth, necessary to remove for the resection, first, and then wait some months until the extraction wound is completely healed and atrophy of the alveolar process on the place of extraction has taken place. Then the surgeon can proceed, as in our case; that is, excise a piece of the jaw without entering the oral cavity; second, a chain saw led around the mandible by a Dechamps needle is the best instrument for resecting a piece of the jaw; third, the detached parts of the jaw are best kept in place by wiring through the mandible and again by wiring together the teeth next to the place of resection by means of Angle's fracture clamps. The so-called sectional splint, also invented by Dr. Angle, of St. Louis (*Dental Cosmos*, April, 1903), seems to me not practical. This splint is made before the operation, and consists of five sections, two of which correspond in size to the two parts of the jaw to be removed. After removal of these parts, the intermediate sections of the splint are removed and the remaining parts are supposed to fit into each other. Theoretically, this is a splendid suggestion, but, practically, there is no surgeon and no saw that will excise a piece of the jaw in such an exact mathematical way that the two parts of the splint would just suit each other. We have to make our splints to fit the excised jaw, and not excise the jaw to suit the splint.

The result in our case will permit the suggestion that double resection of the jaw, with proper aseptic precautions, can successfully cure exaggerated protrusion of the mandible if orthodontic treatment has failed. This is one of the operations where the combined efforts of the surgeon and dentist will lead to success.

Discussion of Dr. Ballin's Paper.

I assure you it has been a great treat to me to hear a clinical talk of this kind by so eminent a surgeon as Dr. Ballin has proclaimed himself to be by the results attained in treatment. It is the first time in the history of The American Society of Orthodontists that such a clinic has been given, and we are glad to have such a record as the work which has been done so successfully for its kind as shown this morning. Regarding the technique of the operation there are two ways of looking at this matter, as Dr. Ballin has said, from the surgeon's and the orthodontist's standpoint. The orthodontist's standpoint, perhaps, has been a theoretical one, because his training has not been along the line of such operative surgery that he could do the operation with the same ease that Dr. Ballin

Dr. F. H. Pullen.

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has. However, the orthodontist does believe he could suggest a little in theory, and perhaps in practice, to the results attained here; or perhaps he might treat the case without the surgical operation. Now we, as orthodontists, do not pretend to tell the surgeon anything that is new to him, but there is no doubt that the medical profession can profit by suggestions from the dental profession, and *vice versa*, and by this co-operation we will further and better our practices and benefit humanity thereby.

In the case the doctor has presented to us this morning, the technique of the operation has appealed to all of us. We want to know more about it so as to be able to speak with absolute authority with reference to these operations. We want to see more of them.

The objection which Dr. Ballin presented to the idea of accurately measuring, or rather sawing, these sections, and applying a splint measured exactly for the space, may be well taken from the operator's standpoint. I admit from the orthodontist's standpoint it has been somewhat theoretical. But I do believe we can arrive at a little more exact idea of the true relations the jaws should be in after the operation, by some measurement at least. I do not know whether the doctor in this case made any measurements, or whether the dentist made any measurements. I would like to have the data, because it is interesting to us. The orthodontist is measuring spaces and distances every day, and the idea that these measurements might be left out, to him might seem unfeasible, and perhaps a little impracticable.

This case represents more to us than Dr. Ballin realizes. It means that the medical profession, and the dental profession co-operating with them, have achieved success in more than one case of this kind; but here is a case which we have been enabled to see with our own eyes, and determine the exact result accomplished, and it is the first time in the history of a dental society where those results could be publicly observed. These cases have been written up for dental societies, but no one except the operators and a few friends have seen the operations or the actual results.

There are some questions we want to ask. We have always wanted to know, in the technique of the operation, what was done with the inferior dental artery, and the exact cutting that was made through the harder and softer portions of the bone.

In regard to the technique of the dentist's part of this operation we have a few kindly criticisms to offer. We prefer that impressions for casts and models be made with plaster of Paris rather than with compound, because we can then more accurately determine the exact relation between the arches before and after the operation. Impressions taken with compound so stretch out of shape that measurements are not at all accurate, in case they are wanted.

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As to the possibilities of restoring the normal relation of the jaws without operative treatment by this method of resection of the mandible, the orthodontist perhaps has had experience with which the general surgeon may not be familiar with reference to these extreme cases. There may not be many of them, but they are numbered throughout the country by the dozen at least, where I think cases of this severity have been restored to normal by restoring the spaces where teeth have been extracted, and inserting artificial dentures and bridge work, thus restoring the normal number of teeth in both arches, and at the same time restoring the balance of the face, even though it may be a little unusual at this age.

So far as the condition of the patient at present is concerned, the orthodontist has this suggestion to make, that a little orthodontic treatment might still be done on account of the loss of the bicuspid tooth on the right side above, obtaining spaces and restoring teeth, thus securing a more normal relation.

It is interesting to us to see an operation of this character performed without opening into the oral cavity. It is a new thought to me that we thus get rid of the possibility of septicemia. Septic material may thus be kept from the wound, and healing by first intention is thereby favored.

I would ask the doctor to repeat again the manner in which he took care of the apparent excess of soft tissues of the periosteum, mucous membrane, gum and muscular attachments which would seemingly be present and might interfere with uniting the two sections of the mandible.

I want to thank the essayist for the contribution he has made to the society in the report of this case.

Dr. Ballin has certainly given us something interesting in the line of surgery, and I am of the opinion that it is an operation that very few surgeons would undertake to perform, and Dr. Ballin deserves great credit for performing such an operation without leaving a scar, although this may be due to its healing by first intention.

While I have great admiration for his work from a surgical point of view, I must disagree with him as to its being the best method to correct this case. I can not help but think that we could get better results by orthodontic treatment. There have been many cases quite as extensive as this one that have been successfully corrected without the loss of any teeth, which, to the true orthodontist, means a good deal. On the other hand there have probably not been half a dozen operations of this nature ever performed. To go back a few years before the introduction of the Baker anchorage the orthodontists would consider it an extremely difficult case to correct successfully on orthodontic lines, while now it is almost an every day occurrence.

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Dr. Ottolengui.

It seems to me there are two important features about this paper which I would like to emphasize. The first is that we have been taught that a mandible may be too large—so much so that the only treatment would be by surgical interference. So far as I know, we here have the first success of surgery in the operation such as has been recommended, and the surgeon starts out by telling us the mandible was *not* too large. He admits that. The over-development of the mandible is so rare that it is scarcely necessary to take it into account in our ordinary work. I will not deny that this result has excused this operation, but the resection of a portion of a mandible which is of normal size in order to make it fit an upper arch which is under-developed, is analogous to the extraction of two upper teeth to make the upper arch harmonize with a lower arch which is too small. As a general principle, this operation could hardly be countenanced. It is to be accounted as useful only in cases of extreme need, and not in ordinary circumstances. The very success of the operation is its danger. There is already the mental impression in the mind of the operator looking to further operations of the same kind. Before we had so many operations on cleft palate cases the surgeons wished the self-gratification of doing the operation, but if the condition could be remedied by other means it would not be fair to operate.

If the mandible is normal an effort should be made to put the abnormal part (in this case the maxilla) right, thus making the abnormal fit the normal. I protest against this operation as a reasonable one for future work, except it be in the rare cases of over-developed mandibles.

The other point of interest is, the wholly external character of this operation. By keeping the internal tissues intact Dr. Ballin has prevented infection from the oral fluids. For this he should have a great deal of credit, and I hope he may write this up fully and illustrate it thoroughly so we may make a record of credit to him, to us and to surgery.

Dr. Dodson.

Dr. Ottolengui speaks about the maxilla in this case being under-developed. I do not think it is under-developed at all. And then he speaks of the mandible as not being over-developed. I think it is. I have never seen a case of this kind where the mandible was not over-developed, and sometimes it is beyond any argument whatever. Where there is little or no normal use made of the mandible, there is at times, for some reason, a tremendous development of the chin.

Dr. Ottolengui.

I would discriminate between an excessive development of the chin and excessive development of the mandible.

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Dr. Dodson.

I mean the mandible always, which, of course, includes the chin.

Dr. Max Ballin.

Several questions have come up during the discussion of this case. The first vital question is, should such cases be operated on at all? I see there is some opposition on your side, which I am not able to combat. This young man came to me with the statement that he had orthodontic treatment twice without result. I had to take his statement. I can not say the men who may have treated his case knew nothing about it. If some of you have accomplished better results I must say that I should appreciate it, but certainly nothing was accomplished in this case. So far as I know, orthodontists require a very long time for treatment. Much of the patient's time is required. This young man had to make a living, and I think the result should, because of its promptness of accomplishment, its safety, etc., be valued on those accounts. This young man would have been in the care of the orthodontist for two years, and it would have been pretty hard on his purse. Anyway, I think this operation should not be entirely discredited. We have two or three men here who perhaps can do this work. This patient thought he went to good men, and so he did not want to go to others.

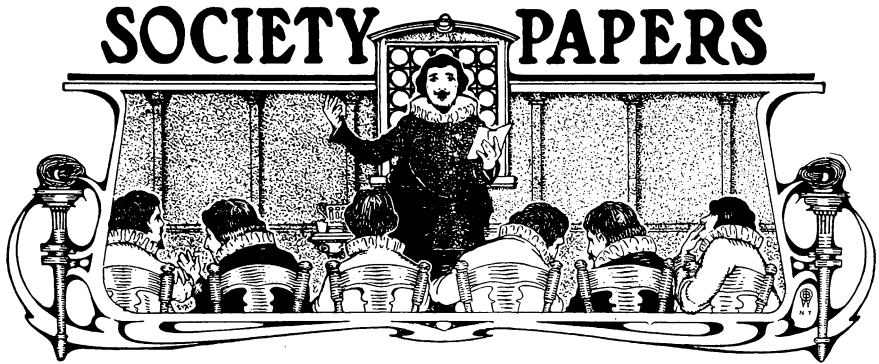
I am not aware of the wonderful things you have done along this line, and I hope you may take these cases entirely away from the surgeon. That is my wish. The first operation for correction was done when the patient was seven years of age, I think, and then again when he was fifteen.

I am not able to discuss the question as to whether the maxilla or the mandible was responsible for the deformity; I have the impression it is the maxilla. Also, as to the technical part of model making, etc., I can say nothing.

As to the surgical technique, as to what becomes of the superfluous soft parts, I may say if we take away an organ and have surplus of skin and soft parts, that always disappears; it never is in the way. Nature takes care of that. We do not need to cut a particle of the soft parts away. They are taken care of.

Hemorrhage in this case was practically nil. Only the small lower branch of the mental artery need be clamped and tied. The mandibular artery is much written of; it never disturbs me. It bleeds a moment from the wound, and stops right away. This hemorrhage is absolutely not disturbing. I have done a good many resections and never had any trouble. The nerve is severed, but it does not seem to cause any anesthesia at all. The lower branch of the trigeminus nerve probably takes care of the sensitive parts.

I thank you very much for your kind attention.



Some Influences which Affect the Functions and Structures of the Dental Pulp.

By LEUMAN M. WAUGH, D.D.S., Buffalo, N. Y.

Read before Third, Fourth and Fifth District Dental Societies of New York at Schenectady, October 15, 1907.

It is not my intention at this time to attempt to cover all that is known of the influences that affect the functions and structure of the dental pulp. This would take much too long. I hope simply to direct attention to a few of the more important facts which, it would seem, must have a positive bearing upon our treatment of this organ.

In society discussions and the current literature of dentistry, one finds the most extreme diversity in practice. There are those who practically never destroy a pulp, and again those who extirpate the pulps of adult teeth almost promiscuously. The advocates of either method must be accorded sincerity. This extreme difference of opinion, it would seem, must be due to an improper understanding of the structure, functions and the influences which affect this organ.

Structure of the Dental Pulp.

The dental pulp forms the dentin, and in the fully developed tooth both nourishes and renders it sensitive. It is not a complete tissue in the essential meaning of the term. A tissue is an aggregation of similar cells and their derivatives the intercellular substances. These elements, however, must be sufficiently formed and properly associated, so that the organ which they comprise must have, not only a complex internal structure, but sufficient resistance to maintain a definite external form. This is not true of the tooth pulp. It exists as a soft mass much

resembling embryonic tissue. The intercellular substance is a mucus-like matrix of modified protoplasm, containing some loosely arranged connective tissue fibers. This supports many cells which are not closely



FIG. 1.

FIG. 1.—Section of the peripheral part of the pulp, showing: *a* the inner zone of dentin; *b* the odontoblastic layer; *d* the loosely arranged connective-tissue fibers and cells.—“Dental Microscopy,” Hopewell Smith.

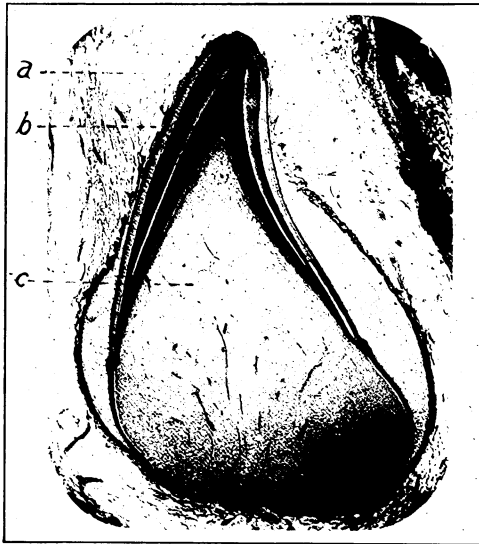


FIG. 2.

FIG. 2.—Longitudinal section of a dental follicle of an anterior tooth, showing at *a* the forming enamel; *b* the dentin; *c* the dentin papilla, which forms the dentin and is the forerunner of the dental pulp.

intermingled in the deeper structure, but which have always a definite space existing between them (Fig. 1). On the surface, in contact with the dentin, the cells are much more numerous and form a comparatively

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continuous layer. These are the odontoblasts, or cells which normally form the dentin. This soft, pulpy structure is encased within unyielding walls of dentin, which normally protects it completely from the impress of adjacent parts and irritating influences from without. The forerunner of the pulp, the dentin papilla, is at first without this protecting wall. As it forms the dentin it encases itself, becoming progressively smaller as more dentin is formed (Figs. 2 and 3.) Were it not for this encrustment,

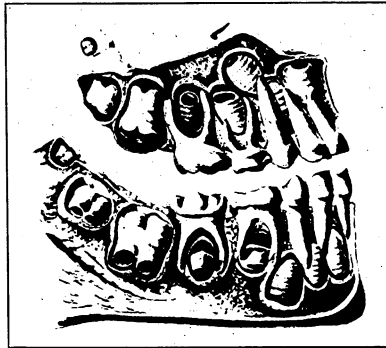


FIG 3.

FIG. 3.—Dissected jaws of a child about four years old, showing deciduous teeth with apices formed and pulps encased. The permanent teeth are seen occupying crypts in the jaw and show various stages of development.

Nature would dispose of the papilla in a manner similar with the other formative structures of the body, that is, either removal by resorption after their duty of forming tissue is done, or by so modifying their physical characteristics as to enable them to withstand the comparatively rugged impress of contiguous parts. Neither occurs in the tooth pulp. It is a peculiarly modified structure and can exist only in its unique environment.

Circulation of the Pulp.

Closely associated with the structure and function of all organs is the circulation. That of the pulp presents notable peculiarities. It is richly supplied with blood vessels. These consist of a single layer of endothelial cells and some scattered longitudinal muscle fibers. Not possessing a complete wall of muscular tissue, they are not under the control of the vaso-motor system of nerves. These vessels are in very close relation with those of the peridental membrane. The arteries enter at the apical foramina, and soon break up into capillary networks, which are closely associated with the odontoblasts. The veins are numerous

and anastomose freely. They pass out through the apical foramina and are quite probably continuous with those of the peridental membrane. Here please note that the area of entrance for the arteries and exit for the veins is identical. The blood supply to the pulp, and the venous return from it are through the same minute apical foramina (Fig. 4). When from any cause the arteries are abnormally full, as in arterial hyperemia, their expanded walls tend to compress the veins. This prevents the

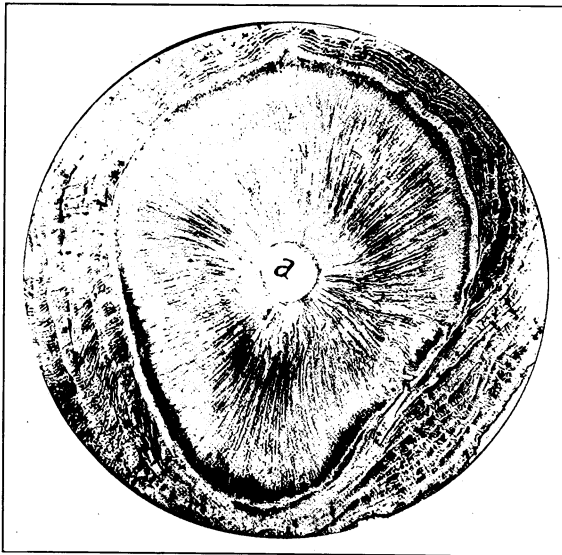


FIG. 4.

normal passage of blood from the pulp, resulting in its ready engorgement. When the blood pressure within becomes greater than that of the arteries at the entrance, the veins emerging at the apex begin to dilate, resulting in gradual compression of the arteries, with consequent diminution in the supply of nourishment to the pulp cells. Thus it is seen that food supply and the removal of waste and morbid products are very easily impaired and in extreme degree. Being encased in unyielding walls, great pressure is developed and much damage to tissue easily results. The intensity of pulp pain is due to the ready possibility of great pressure upon the nerve terminals. The pulp is also without the usual lymphatic vessels, therefore the products of disease must be removed by the veins, an added duty not thrown upon them in most other tissues of the body.

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From the foregoing study, if its correctness is conceded, it must be evident that disturbances of the dental pulp are more destructive than in tissues of the body in general. This is for four principal reasons:

- (1) It is not a perfect tissue formation.
- (2) It is encased within unyielding walls.
- (3) Physical peculiarities in the blood supply.
- (4) The absence of lymphatics.

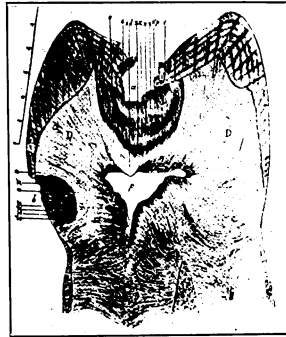


FIG. 5.

FIG. 5.—Longitudinal section through the crown of a human molar, showing an occlusal cavity of decay. *P* indicates the pulp chamber, much constricted by secondary dentin, designated by *S. D.* The "zone of translucency" or "transparent zone of Tomes," is the lighter area circumscribing the decay and lying between it and the pulp cavity. This lighter area has undergone so-called tubular calcification or dentinification.—From Burchard after Gysi.

There can be no sharply defined line of separation between diseases of the pulp and those of vital dentin. The pulp forms the dentin, and the living matter which both nourishes and renders it sensitive, termed the dentinal fibrillæ, are simply attenuated extensions of the peripheral pulp cells. Therefore any disturbance of this living sensitive matter of dentin must produce irritation of the pulp proper in more or less marked degree.

For convenience, we shall consider the influences affecting the pulp under two heads. 1. Infection, and 2. Thermal and other irritants.

Infection of the Pulp.

Infection is the act or process incited by the entrance and proliferation there of harmful micro-organisms. Dental caries is a condition produced as the result of bacterial action. As the destructive process advances the pulp endeavors to protect itself against the invasion. This barrier may be formed in two ways: (a) So-called calcification of

the tubules. (b) Secondary dentin. If the progress of decay is slow, the pulp may have sufficient time to fortify considerably. If, however, the advance is rapid, this does not occur and irritation soon encroaches sufficiently to cause pain. On examination of this class of cavity, it will usually be found that caries has so far developed that very much or all of the dentin is decalcified, a part remaining as a soft leathery mass, so yielding that slight pressure with a blunt instrument or tightly rolled pellet of cotton will cause pain. If a layer of normal dentin remains, slight pressure will not bring painful response.

Decalcification precedes invasion by bacteria, therefore if the pulp has been comfortable, and all of the decay may be removed, and still there remains a wall of normal dentin, even though quite thin, the pulp has not been infected and may be conserved by a proper filling of the cavity. If, however, the removal of all the decalcified dentin would expose the pulp, what shall be the treatment? (Fig. 5.) Is it good practice to attempt to sterilize the leathery mass, and if at all possible to make the tooth comfortable under a test filling for ten days or a fortnight, to replace with a permanent filling?

Treatment of Exposed Pulp.

If the patient is still in the period of adolescence, is healthy, and the paroxysms of pain are not severe, prolonged or frequent, the writer believes it good practice to attempt to save the pulp. If the patient is so young that there is doubt as to the completion of the roots, all possible effort should be made to retain the organ, even though infection has invaded a part of the bulbous portion. This involved area should be removed under aseptic conditions, and the remaining part most carefully protected from pressure and thermal irritants and judiciously sealed. At this age the pulp is large, the circulation copious, and the formative cells so active that even though slight pain occurs at times, the chance for the completion of the formation of the root apex is good. In such cases, removal of the pulp will usually be necessary a few years later, but if in the meantime the root has been fully formed a most important result has been obtained.

If the patient be an adult, all carious tooth tissue should be removed, even though it mean pulp exposure. This organ should better be extirpated than sealed by a zone of dentin, softened and invaded by micro-organisms. It is difficult to destroy all the bacteria and their spores in the leathery mass. Those remaining alive will die of starvation. The dead bodies of the bacteria become decomposed, producing poisonous products which are positively destructive to the pulp. It may take some little time for their absorption but it must surely follow.

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Irritation of the Pulp.

The second heading, thermal and other irritants, will include very slow progressing caries, chemic irritants as sweet, sour, salt, etc., and thermal shocks.

If these are severe and have caused pulp pain which continues for ten to twenty minutes after the removal of the irritant and recurrence is frequent, say daily, and has existed for weeks, the walls of the blood vessels will have become so altered in their structure that recovery of their tone is extremely doubtful. In adults, removal

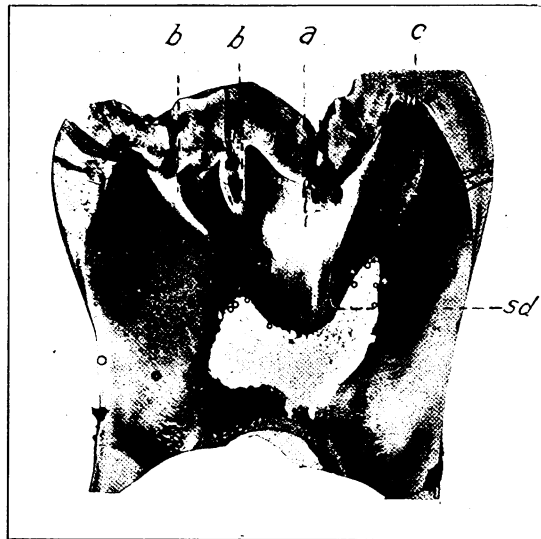


FIG. 6.

FIG. 6.—Longitudinal section of the crown of a human molar, showing in the light areas of dentin so-called tubular calcification or dentinification. At *a*, it is caused by a fissure; *b*, by checks in the enamel; *c*, by wearing away of a part of the thickness of the enamel. Secondary dentin is shown at *S. D.* These protective changes have taken place without the consciousness of the individual.

of the pulp seems best, with the possible exception of the anterior teeth where the question of shade is all important. Teeth containing such pulps will bear occasional inspection for signs of death.

It is appreciated that normal dentin supplies something to enamel which sustains its integrity. This quality, however, seems to diminish and gradually disappear in the presence of crippled pulps.

When the irritants are mild and long continued, slow pulp degeneration occurs. The cause and effect are distinctly different from the foregoing.

A pulp is best and probably perfectly protected by normal dentin and unbroken enamel. Any modification of these structures, whether induced mechanically or chemically, results in reactionary efforts to protect itself. This occurs even though the alteration be so slight as a mere wearing away of part of the thickness of the enamel or a fracture of it,

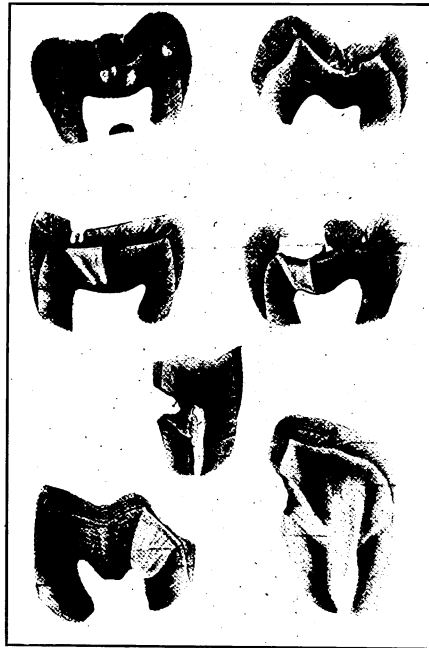


FIG. 7.

FIG. 7.—Longitudinal sections of the crowns of the human teeth, showing tubular calcification and secondary dentin.

even though not detectable by natural vision. From this it will be understood that the irritation exists before the condition is recognized either by patient or dentist. The normal pulp responds only to thermal changes. After exposure of the dentin it will react to any agent which will irritate the naked ends of the fibrillæ, as acids, sweets, mechanical means, etc. This occurs in abrasion, erosion, exposures of the necks of teeth, caries, when of slow progress, and beneath all fillings and crowns placed on vital teeth.

The dentist, except in rare cases, does not become aware of the necessity for operative measures until the dentin is nearly or wholly exposed, at which time the pulp has begun to fortify itself against ab-

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normal influences from without (Fig. 6). It has been proved that no filling material or combination of materials available can insulate the pulp of a tooth so well as perfect enamel and dentin, therefore *all* filling materials and crowns placed upon vital teeth permit of a continuance of shocks from heat and cold. These vary in degree from a mildness which is not noticed by the patient, to those which are so severe that un-

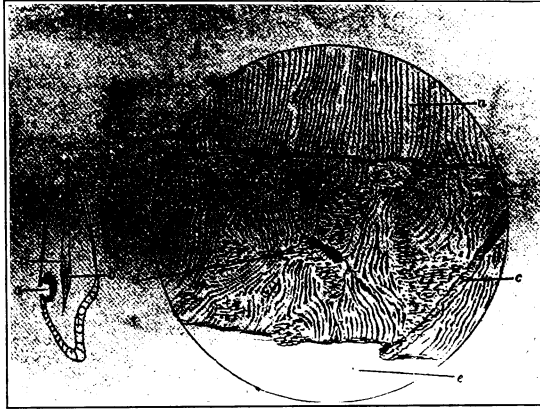


FIG. 8.

FIG. 8.—Secondary dentin resulting from irritation of the dental fibrils by caries. *A* is a longitudinal section, showing at *a* the cavity of decay; *b* the deposit of secondary dentin. *B* Illustration of the minute structure of the secondary dentin. *a* is the primary and *b* the secondary dentin—"American Text-book of Operative Dentistry," after Black.

less the condition is very soon remedied the pulp will undergo rapid degeneration and death. The mild irritants are worthy of special consideration. They continue to stimulate the pulp until changes have taken place which insulate to the degree which existed before the enamel and dentin were disturbed. When this state is reached it ceases its formative action because the irritating influence is overcome. This is accomplished by a stimulation of the pulp to constructive activity, resulting in the formation of tubular calcification and secondary dentin, these serving as a barrier against destructive influences from without. There is a generally accepted and well established rule that any influence which stimulates a formative tissue to production beyond the typical demand, or, in other words, after it has had a period of physiologic rest, causes a degeneration of the tissue. This holds good of the dental pulp as it does of the other tissues of the body.

It is well known to all that secondary dentin and tubular calcification are necessary to the success of very many of the dental operations which we perform, especially in young patients. There is, however, a limit to the benefits to be derived from constructive changes in the pulp. This is due to a degeneration which occurs within its structure as a result of all secondary dentin formation, no matter how slight. The degree of pulp decline depends upon the extent of secondary deposits.

The question, therefore, resolves itself to this: Where shall the border line be drawn between—

- (1) Secondary deposits which do not endanger pulp vitality;
- (2) Secondary deposits which do endanger pulp vitality.

Pathologists group secondary deposits into four principal classes:

- (a) Tubular calcification or dentinification;
- (b) Secondary dentin;
- (c) Pulp nodules;
- (d) Calcic degeneration of the pulp.

We shall consider in detail the first two only.

Tubular calcification includes the changes which take place in the walls of the dental tubules which lead to their constriction and obliteration. This area is known as "the zone of translucency" or "transparent zone of Tomes," and is situated between the area of irritation and the pulp (Fig. 7). The exact process involved in its formation is not understood. Many believe it due to hypercalcification, others to decalcification. In either case it may be regarded as a physiologic barrier against pulp irritation. It causes no considerable change within the pulp.

Secondary dentin is a deposit of new dentin upon the walls of the pulp cavity after the typical demand of the tooth has been satisfied, or after the pulp has had a period of physiologic rest. It is caused by irritation, most commonly thermal, which produces over-stimulation of the formative cells of the pulp (Fig. 8. See also Figs. 5, 6 and 7). As a result the odontoblasts gradually degenerate, and if large masses of secondary deposit are formed, they become obliterated, in which case the deeper cells of the pulp may take on the work of dentin formation. The pulp becomes more fibrous and less functional with advancing age. The products of degeneration must be removed by the veins. These are closely associated with those of the pericementum, therefore, it is quite possible that this membrane may suffer in consequence. This may explain, in part, the benefits derived from pulp removal in the treatment of pyorrhea. The increased blood and nourishment to that tissue is also an important factor.

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Much secondary dentin greatly modifies the size and form of the pulp cavity, especially the root canals. These tend to become constricted and oftentimes tortuous (Fig. 9). Associated with this slow degeneration is often found the formation of pulp nodules and cylindric calcification of the pulp. This condition may be productive of neuralgia. All of these secondary formations tend to greatly complicate the proper cleansing and



FIG. 9.

FIG. 9.—Longitudinal section of a human superior bicuspid showing secondary deposits in the pulp cavity, which would make proper cleansing and filling extremely difficult.

filling of the pulp cavity. Therefore when the existence of the causes of pulp degeneration become evident the writer firmly believes in the extirpation of the organ for two principal reasons:

First. The harm that may result in contiguous soft tissue, especially the peridental membrane, before pulp removal, and,

Second. Because of the increase in the physical difficulties of successful root treatment.

In consideration of these facts, is it good practice to leave pulps in teeth upon which operative measures are necessary in cases of—

First. Slow caries which has invaded deeply and much of the pulp chamber has become filled with secondary dentin?

Second. In abrasion, when the crown has been worn to say one-half of its original length?

Third. In erosion when the acids have scooped into the original position of the pulp cavity and the area has been filled with secondary dentin?

Fourth. When preparing teeth for shell crowns and much removal of tissues is necessary, as in elongated or inclining teeth?

The writer's answer is no. He believes it much better practice to fill the pulp cavity while physical conditions favor thorough work.

The normal relationship of the root of a tooth in its socket is of vastly greater importance than the vitality of the pulp and dentin. By enclosing a crippled pulp, even though it show no signs of degeneration for a time, conditions are being fostered which must eventually result in pericemental involvement. Therefore from the facts considered the writer does not believe in the promiscuous destruction of pulps after thirty years and certainly not before this age. But on the other hand he advocates pulp removal—

First. When decay has so progressed that all of the overlying dentin is decalcified, except in young subjects.

Second. When prolonged pulpitis occurs beneath fillings of some years' standing. This seems especially true of gold.

Third. When operative measures are necessary upon teeth either much abraded or deeply eroded.

Fourth. When much dentin has to be removed. in elongated or inclining teeth in preparation for shell crowns, especially metallic.

Fifth. In treatment of advanced pyorrhea.

Sixth. In facial neuralgia when associated with or superinduced by pulp degeneration.

Lesions of the Apical Zone.

By DR. CHARLES B. ISAACSON, New York.

Read before the Second District Dental Society, March, 1908.

In presenting this article, which I have termed "Lesions of the Apical Zone," I am well aware that I am entering into a field which has been often traversed, yet still, in the pathway of one's experience we gather new information, and what we have not observed at one time strikes us very forcibly at another. Therefore, the same field of action can be crossed in many different ways, each one giving us a new point for observation. To be given a rule in medicine or dentistry is one thing; to

apply it successfully in every case is quite another, and to be able to make a departure when by a pure process of reasoning we find that rules do not apply, becomes then a natural logical act awakened by our powers of observation. We must never put ourselves in the position to fail by rule rather than succeed by innovation.

We will now take up such cases of chronic alveolar abscesses or lesions as have resisted treatment after continued and persistent medication. I mean those cases where there is a *persistent discharge of pus from one or more fistulous openings*. I wish to examine into the causes and conditions of such cases, and thence draw a conclusion as to the pathological nature of the same. It will then be possible to advance as a theory *that there exists in the anatomical nature of the apical zone such conditions that, given certain causes, the same effects follow*. Many cases have come under my observation where teeth have been treated for days and even weeks; all sorts of applications and all sorts of remedies have been tried; and, perhaps to the chagrin of the patient and practitioner, no good result has been obtained. It is here where surgical interference is absolutely necessary, and medication through the root has reached its *limit of possibility*. The practitioner has failed to recognize the condition which exists in the area above the root, and has relied upon remedies to accomplish that which only direct surgical interference can do. We have an infected zone above the roots—*the contained matter is discharging or trying to discharge through the line of least resistance, and it becomes the duty of the practitioner to establish a clear drainage*.

In order to make clear what I understand to be "lesions of the apical zone," I wish to call your attention, first, to the anatomy of the parts involved; second, to the causes of the disturbances in these parts; third, to the possible sequelæ and combinations from acute or chronic conditions of the parts involved. By taking these points separately I believe the pathology will be better comprehended.

Let us first look at the anatomy of the subject which we are about to discuss. The tooth consists of the crown and root. The crown contains the pulp chamber, while the afferent and efferent vessels of circulation, together with the nerve fibers, occupy the canal of the root. The root is held in the alveolar process by the pericementum, sometimes called the alveolar dental membrane. Above the root there is what we may call the *apical zone*, which is *the most important point to hold in view*. When from any cause whatsoever the pulp becomes inflamed and sepsis takes place, the pulp begins to disintegrate and forms gases. These either are dissipated through some opening made by caries or through the foramen into the apical zone; the pericementum becomes

Anatomy of Root Environment.

involved, first, by the inflammation, second, by the pressure of the gases of decomposition; and the tooth becomes loose in the socket, until the tension of the confined gases are relieved by discharge in the line of least resistance through the alveolar wall. The inflammation is in proportion to the thickness of the wall encountered. If the contents of the tooth be emptied by mechanical or chemical means, it may in acute cases prevent a discharge of pus through a fistulous opening, and the tooth becomes normal after the proper antiseptic treatment. If, however, we have such complications as multi-rooted tooth, tortuous root canals, some abnormal irregularity of the root or impaction of some foreign body, the sepsis can not be fully controlled from within, and the process of infection continues to exist about the root or apical zone.

We will now consider the various complications which ensue in the apical zone when the inflammation has been unusually violent or when the sepsis has existed for a long time.

First.—We have the detachment of the pericementum from the root forming a pus sac or pyogenic membrane.

Second.—The disintegration of the pus sac causing, in time, more than one perforation of the alveolus.

Third.—A possibility of the sac being transformed into a cystic tumor.

Fourth.—The alveolus being bulged out by the pressure of gases has become necrotic, forming a sequestrum in part or whole.

Fifth.—The root, having been surrounded continually by acrid pus, has become necrosed.

Sixth.—The so-called "blind abscess," where the apical zone has been infected for some time with just sufficient outlet to keep an acute attack in abeyance.

Detachment of the Pericementum from the Root forming a Pus Sac or Pyogenic Membrane.

Here two conditions may exist. "A."—This occurs when there has been a continued sepsis of the tooth and the gases of decomposition have constantly discharged through the foramen with sufficient pressure to detach the pericementum, causing it to form a sac or pyogenic membrane; the apical zone becomes involved and infected, and we must look to this condition for the cause of the trouble. In the first place, with just a little reflection, we can see that the decomposing contents of the tooth, having been discharged through the foramen, has certainly been the exciting cause *primarily*. The continued irritation has been sufficient to cause the formation of a pyogenic membrane. *This* now becomes the center of grave infection, and it is hardly *possible to reach the graver*

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exciting cause by means of medication. We must establish what nature has been trying to do, *viz.*, an outlet—surgically speaking, a *clear drainage*. When the contents of the infected area has been thoroughly evacuated, we will have used the only *scientific method for relieving such cases*.

“B,” is the same condition where the pericemental membrane has been gradually detached from the root by means of the encroaching necrosis of the alveolus, and the serumal calcareous deposits caused by accompanying *pyorrhoeal discharges*. We will find here the apical zone is seriously involved. Pressure over the apical zone on the pyorrhoeal affected tooth, causing the pus to well up around the tooth, will indicate this condition very clearly. I wish to call attention emphatically to this condition of chronic pyorrhoeal cases, because I *hold that just as soon as the invasion of the apical zone has taken place, the death knell of the tooth has been sounded.* We have a *progressive necrosis of the alveolar process* ending in the exfoliation of the tooth. No doubt many practitioners have found that the many treatments accorded pyorrhea alveolaris have hardly succeeded, and after the most persistent treatment the case was given up as lost. I wish to emphasize again the *folly of medication in these advanced cases*, and I wish to *emphasize* how seriously wrong it is for some men to advocate the use of a hundred different kinds of instruments for scraping and cleansing the roots, *as if the few serumal deposits, the aftermath of the unsanitary condition*, and pyorrhoeal discharges, could be the cause of the continued and ever-increasing necrosis of the socket. If we reflect that just as soon as the alveolus has become necrotic, the pericementum detaches itself very rapidly, we may conclude with a certain degree of logic that the apical zone has become involved. This will account for the copious discharge in these cases. Such conditions call for pure surgical interference. We have a necrotic area and the apical zone above involved, and unless we attack this *surgically, very little can be hoped* for the tooth, and even with the best possible procedure the *percentage of recovery is rather small*. We have to assume not alone that we have local disturbances, but that we have to ascribe much to the initially atrophic environments due to systemic causes.

In condition “A” we have the pyogenic membrane and the invasion of the apical zone caused by sepsis from within.

In condition “B” we have the pyogenic membrane and invasion of the apical zone caused by sepsis from without.

In condition “A” the interior of the tooth should be thoroughly cleansed and disinfected so as to be no longer an exciting factor.

In condition “B” we have a live pulp with accompanying pathological changes. It stands to reason that *no pulp can remain normal* when

so vital a membrane as the pericementum is affected, and changes, though surprisingly slow, still take place within the pulp and necessitate the devitalization and *removal of the same*.

In condition "B" we have the absorption of at least one wall, and cure of such cases should not be undertaken unless we have a reasonably *retentive wall left*.

The treatment in condition "A" is to cut off the interior of the tooth from being an exciting factor—disinfect the same by means of peroxid of hydrogen or dioxid of soda, and the tooth is then to be sealed at once.

The prognosis of such cases which we are about to examine into is favorable in a great many instances, and it is barely possible to save a great many teeth which have hitherto been sacrificed to the forceps, but before undertaking any treatment or steps of a decidedly surgical nature I wish to *emphasize particularly* that it is absolutely necessary for the dental practitioner to know the condition of the health of his patient. He must bear in mind that the tooth is a part of the human economy, and that everything else being equal, although the treatment of such a member is relatively easy, should we encounter any condition of the body such as the incurable lesions caused by Bright's disease, diabetes, dyscrasia after typhoid and malaria, or syphilis, we are beginning to tread upon unfavorable ground, and we should pause before giving a prognosis until we have thoroughly familiarized ourselves with the systemic condition present. It is well here to put ourselves in touch with the physician of the patient and ascertain beyond a doubt whether his physical condition would warrant us to undertake the surgical procedure in these cases. We must also recognize that in a certain number of cases there may be an idiosyncrasy against the patient retaining a dead tooth *in situ*. *We must also recognize that some dead teeth, no matter how skilfully treated, are a source of continual trouble, and no matter how carefully we try to preserve them, and no matter how assiduous our attention might be, these will be lost to the patient.* Therefore, bearing this in mind, our prognosis must be guided entirely by the case before us. When we have taken these precautions we have satisfied our patient and ourselves that everything has been done to preserve the useful member.

**Surgical
Treatment.**

The treatment which I wish to suggest for these cases is purely of a surgical character. It must be our bounden duty to obtain a clear drainage. In order to do so an anesthetic of some kind is required; either nitrous oxid or ether where the cases are serious, or the use of a local anesthetic. I have found a very expedient local anesthetic in beta eucain accentuated by a small dose of cocain. The usual precautions of knowing the patient's condition and health should be observed,

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and such antidotal remedies as whiskey, nitro-glycerin and strychnin should be *administered in advance*. A reclining position will tend toward making the patient feel quite comfortable. The tooth, if single or multi-rooted, should be thoroughly cleansed and its contents and roots disinfected by means of dioxid of soda or peroxid of hydrogen, and then sealed with a powerful antiseptic dressing. We will now proceed to inject a solution of cocain in the gum as near the apex of the root as possible. After we find the parts thoroughly anesthetized, we should make a horizontal incision. We can now probe the alveolus for perforations and find the area of infected bone. When we have ascertained this, we should make an opening into the alveolus, for which I use a pyramidal shaped drill, practically a revolving surgeon's trocar. Having obtained the first opening, we proceed to enlarge the same by use of burs graded in size to meet the case. When we have the opening large enough, a rose shaped bur should be used to curette the apical zone and all the surrounding necrotic tissues. The pyogenic membrane or sac can be removed by the use of the bur gently around the top of the root, or can be scraped away by means of a small sized bone curette. The necrotic bone can be felt to give way under the bur, whereas the healthy bone offers a greater resistance. A few cases will give the proper tactile sense to the practitioner so that he can feel the dead bone give way under the bur and feel the instrument beginning to rock from the resistance of the healthy bone. The cavity should now be thoroughly irrigated with a powerful syringe so as to remove all the debris and *spiculæ*.

I have found a most constant and efficient remedy in *eugenol* in packing such cavities. Its properties as a disinfectant are much stronger than carbolic acid, whereas it acts in addition as an anodyne and stimulant to bone tissue. I wish to call *particular attention to this remedy*, which although known may not have been used or applied for such purposes, but I feel quite sure that a trial will show its *signal properties* and efficiency. By saturating a piece of gauze with twenty-five per cent. eugenol and chloroform, we can relieve the painful condition after such an operation. Of course, it is sometimes expedient to use iodoform if the nature of the case requires it. These dressings should be removed daily until we find that the secretions are practically normal. Irrigation of the parts each day will bring about a rapid healing.

In condition "B" it will be necessary, as the wall of the tooth has become absorbed, to steady the loose member by means of bands to the neighboring teeth. The tooth may thus remain a passive member for some time, but nothing positive can be given in the way of a prognosis in

such cases. An incision into the alveolus by dental engine is sometimes followed by what we may call a traumatic cellulitis, and it might be well to inform the patient that considerable swelling might ensue and that the cheek might become black and blue (ecchymotic), otherwise the patient might become unduly alarmed when these conditions present.

Disintegration of the Pus Causing in time more than One Perforation of the Alveolus.

This is an exacerbated condition of the foregoing, and follows a condition of long standing sepsis in which considerable pus has formed and several perforations have taken place. It can be laid down *as a maxim that when several perforations of the alveolus have taken place*, necrosis of the same will follow. When the necrotic wall has been removed, free access to the apical zone should be obtained and the contents removed in a thorough surgical way; we can then expect good results to follow. It is surprising to see how long a tooth will remain *in situ* held by only a part of the process after the conditions above have been *made favorable* to its retention.

Possibility of the Sac being Transformed into a Cyst Tumor.

The pericementum still attached to the apex of the tooth, being continually irritated by the septic condition and having sufficient resistance to the outside irritation, gradually begins to develop and forms a cyst-tumor, which, gaining strength, begins to increase in size, causing an absorption of the surrounding parts. In the maxilla this takes place quite frequently on account of the vascular or porous condition of the bone, and not unfrequently do we find this bulbous mass extending backward into the antrum. In the maxilla grave inroads may take place ere the patient is aware of it, being associated with very little pain, whereas in the mandible, the bone tissue and process being denser, there is more or less pain connected with it. The diagnosis is not very difficult, as the bulbous mass over the apex of the root can be distinctly felt. The excision of the outer alveolar plate, the removal of the pyogenic membrane, followed by the same surgical treatment, will bring about good results.

The Alveolus being Bulged Out by the Pressure of Gases has become Necrotic, Forming a Sequestrum in Part or Whole.

The removal of the sequestrum, the curretting of the apical zone, followed by the same surgical treatment, will bring about good results.

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The Root having been Surrounded Continually by Acrid Pus has become Necrosed.

When the root itself has become necrosed, the discoloration of the tooth will give us the first signal of what we have to encounter. It is very clear that the surface of the root has been subjected to the corroding action of ichorous pus, and it ought to be equally clear that unless we get the environment in a sanitary condition nothing can be accomplished by medication. The tooth might be regarded practically as a foreign body, and as such will sooner or later be exfoliated; still something may be done toward the relief of such a tooth and retaining it by looking toward the apical zone for the hidden enemy.

I wish to caution practitioners against being *over zealous in accepting the theory of amputating the roots of such teeth*. We must consider that we then produce conditions similar to an implanted tooth, and that the osteoclasts will soon get to work, so that sooner or later the root becomes absorbed and the tooth exfoliated. That theory rests upon the assumption that the roots are absolutely the factor of the disturbance, *whereas I claim that the apical zone is truly the seat of the trouble*, and although the tooth may have been the exciting cause in the beginning, it is a passive factor at this time. I wish to emphasize that whatever good might have been accomplished in most cases by the amputation of the roots has been made by establishing an opening into the apical zone, causing a clear drainage and allowing the same to be thoroughly cleansed and disinfected.

The So-called "Blind Abscess," where the Apical Zone has been Infected for Some Time with just Sufficient Outlet to keep an Acute Attack in Abeyance.

These cases are generally where the teeth have been dead for some time and the root canals septic, and the infection has spread to the apical zone. If for some reason the little drainage necessary to give relief to this infection has been cut off, an acute tension in the apical zone takes place. An opening into the alveolus, establishing free drainage, and a thorough cleansing of the apical zone, will accomplish satisfactory results.

Recognizing the above conditions, it is possible to find a combination of a few of the same, for instance, "necrosis of the root," "necrosis of the alveolar wall," and "cyst-tumor" at the same time.

Valuable information can be obtained in the way of differential diagnosis by means of the radiograph, especially in such cases where we have hyper-cementosis of the root or roots, irregularities of the root or impacted foreign bodies. In a large number of cases I have found that the radiograph afforded rather a negative help. Again, it is not always practicable for the practitioner to have a radiograph taken so it devolves

upon him to make use of some reasoning to establish his diagnosis. I have tried to make it plain that an infection of the apical zone should be sufficiently recognized as a powerful factor in the cause of disease. Authors allude to openings to be made above the root, and medication of the tooth through the root, but no mention is made of a distinct recognized infected area above the root or apical zone. I maintain that given infection of the apical zone with such conditions as hitherto described, the various symptoms which we see are explicable. Conversely, if we assume the root to be the only and constant cause, we enter into a fallacy which ought to be recognized at once. I have tried to shed a little light upon a subject which hitherto has been dimly recognized. Presenting this condition before you as I have done, showing that, given adequate causes, recognizable symptoms must follow, I leave it now to your consideration whether, in taking the simplest procedure for relieving a grave condition, I have not struck the logical keynote of the situation. I have tried to advance the theory that no relief can be given by medication alone in most cases, and only surgical intervention can relieve the cause of the disturbance. *The principle of clear drainage is the vital point of success in treating invasions of the apical zone.* For nearly twenty years I have followed out this principle, and I can in all sincerity say that my success in treating such cases depended upon my conviction in carrying out this simple surgical process.

I have omitted to mention such grave complications as carcinoma, osteo-sarcoma and lesions of tertiary syphilis. Such conditions when recognized should be handed to the oral surgeon, as they are a little beyond the scope of the average dentist.

**Cases from
Practice.**

The radiographs which I will show represent two cases which are typical, and which I will take the liberty of reciting. "B.," a chemist, came to me in considerable consternation—he had had several abscesses on the two lower left first and second bicuspid. These teeth had been treated for some time, and yet in spite of the most powerful antiseptics a fistulous opening in the alveolus continued to discharge copiously. His physician and dentist strongly advocated the extraction of his teeth, and also that he should submit himself to the operation of having the maxilla thoroughly curretted, for to all appearances the bone had become affected. By examining the parts very carefully, I found that the roots had been thoroughly cleansed and were filled with antiseptic dressing. After injecting cocain in the gum, I made an exploratory incision and found several perforations of the alveolus through which I could pass my probe very easily. The process toward the molar

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had become somewhat loosened and was as near an approach to a sequestrum as could be. I immediately entered upon a procedure to establish clear drainage for the apical zone, removing all the necrotic alveolus I could find. I enlarged the opening in the apical zone, thoroughly curretting each socket, and after syringing the parts thoroughly and using iodoform dressings, I sent my patient home. Quite a cellulitis took place, which would have been considered quite grave had I not anticipated the same by telling my patient that I expected his cheek to get discolored. I renewed the dressings daily for about two weeks, and very rapidly indeed the parts began to recover, and after the fifth week there was but a mere opening left without any discharge. I had removed the entire alveolar process on the outside, and the teeth were held in place by the back walls and the intervening ridge. Recently the patient returned to me again complaining that the loss of the teeth now was inevitable, for a distinct fistulous opening had established itself at the old seat and a considerable amount of pus was being discharged daily. I noticed that the canine tooth was slightly discolored. I proceeded to open the same. I found a putrescent pulp, which was removed and the tooth thoroughly disinfected with dioxid of soda and peroxid and then sealed with a paste of thymo-eucalyptus and iodoform. The suppuration gradually ceased, but now in order to make my diagnosis practically sure I had a radiograph taken of the parts. The first operation was performed seventeen years before. The canine tooth was treated two years ago, and all the teeth are still in place doing the work of the mouth and healthy in all conditions.

Case 2. Mrs. "T." consulted me in regard to an acute alveolar abscess of a lateral which had penetrated posteriorly into the palate, causing a large, extremely painful bulbous swelling. An examination of the tooth by radiograph showed me that the root had been imperfectly filled. The history of the case was that two years before a pulp had been devitalized, and to all appearances the root had been filled and an inlay put in the tooth. Shortly afterward the tooth became sore, and after a few weeks of continued soreness a fistulous opening appeared on the labial side of the alveolus. This continued to discharge for some time, and was treated by her dentist by spraying this opening with peroxid, listerine and other disinfectants. The swelling would subside for some time and then would return again. This continued on and off for over two years, the tooth always feeling uncomfortable. One evening the pain became excruciating, the tissues became swollen, the tooth loose, and after the most intense pain, a bulbous tumor formed on the inside of the palate. It was evident to me the continued discharge of pus through the alveolus had caused a

necrotic area, which could not be ascertained by the radiograph, but I arrived at this conclusion by the continued presence of pus. I also argued that as the pus had been more or less forming in the apical zone that a severe infection of the same had taken place, and the pyogenic membrane had begun to disintegrate, causing a still more violent sepsis and rapid decomposition of the pus, which, finding the former perforation too small, discharged itself through another part less resistant. An injection of eucain with a tenth of a grain of cocain into the gum opposite the apex of the tooth rendered the parts sufficiently numb for me to make an incision. Using a probe I found hardly any evidence of a perforation through the labial part. I next used an injection in the abscess of the palatine surface, which, on account of the high tension there, caused considerable pain, yet, still, after a few minutes I was able to make an incision in this, allowing a mass of pus to escape. I proceeded now through the labial incision to use my drill and pierce the alveolus, and, as is usual in the case of most laterals, I found the alveolar plate very thick. I entered the apical zone and proceeded to clear out the contents as thoroughly as possible. I next proceeded to irrigate the parts very thoroughly, causing a continued flow of the disinfectant (phenol sodique solution) through the palatine wound. Having thus established a clear drainage I dismissed my patient. I suspected from the condition of the mouth, and from the pyorrheal aspect of several of the teeth, that I had to deal with some condition of the body which would require internal medication. What I had done was to afford immediate relief; what would follow would depend largely upon the systemic condition of the patient. I had every reason to believe that with a clear drainage the parts would yield very nicely to treatment. I referred the patient to her physician and was informed several days afterward the patient was diabetic, although no history of the same had been known to her or her physician before. This condition was taken up by the physician, a rigid diet was prescribed, and within a few weeks the discharge became less and less until practically there was nothing left of the former disturbance. An exfoliation of a piece of necrosed bone from the palatine wound was brought about by injecting the wound daily with a solution of sulpho carbolate of zinc. I had suspected a sequestrum in this part, and upon probing found evidence of a button of bone which had been bulged out or loosened by the evolution of gases. After the fifth or sixth week, the wound closed entirely, and the tooth became absolutely firm. The root was filled with tinfoil and a weak solution of oxy-chlorid of zinc.



Filling Teeth with Gold.

By DR. J. V. CONZETT, Dubuque, Iowa.

Read before the Alumni Association of the New York College of Dentistry.

While gold has been the sheet anchor of operative dentistry ever since dentistry has deserved the name of profession, while it is in my opinion the best filling material that we have at this time, it is also true that it is one of the most difficult of our materials to properly work and one of the hardest with which to obtain perfect results. And yet in the hands of those who understand its physical characteristics and peculiarities and who, understanding them, properly manipulate it, it is a most tractable and obedient servant, preserving the teeth of their patients in comfort and usefulness for many, many years.

As operative dentists it behooves us to carefully study it, to experiment with it, to understand its various good and bad qualities, to know how to bring out the good and to hold the bad in abeyance, and the result will be that we will be delighted with it and use it far more than we have ever done in the past, to the satisfaction of ourselves and the benefit of our patients. Let me say at the outset, for fear of being misunderstood, that I am not inveighing against any of the other materials that we now use. Porcelain, amalgam, guttapercha and the cements, all have a place and a very large place in operative dentistry, but it is to gold that I wish particularly to call your attention at this time, and I must, perforce, do it to the exclusion of the other materials.

Objections to Gold.

The objections that have been raised against gold are its color, high thermal conductivity and difficulty of manipulation. All are valid objections, and if they could not in large part be overcome the objections would be fatal to its use. The objection to color in certain localities, as on the labial surfaces of incisors and cuspids, cannot be denied, and in a largely increasing majority of instances these cavities are being filled with porcelain; in approximal surfaces of incisors, and in cavities involving the incisal angles of the same teeth, the color is also objectionable, but as in many cases strength and durability are of more importance than mere appearance, gold is indicated and used. In these cases the objectionable color can be largely modified by using the gold and platinum foil. I saw a case in the office of Dr. Wedelstaedt last fall, in which porcelain inlays had been placed in cavities in the approximal surfaces of the incisors and all of the inlays had failed and had been replaced by the gold and platinum. The effect was very

good and the patient, a lady of refinement, expressed her very great pleasure at the result.

It is very difficult, in some teeth of high thermal sensitiveness, to overcome the quality of thermal conductivity. It can be modified somewhat by the application of resinous varnishes, but I have yet to find one that will entirely overcome this objection in highly sensitive teeth. I do not like the method advocated by some men, of placing some soft cement in the cavity and then condensing the gold upon that. I do not like it upon theoretical grounds, and I have seen it fail so frequently in practice, that I am convinced that my theories are correct. We know, through the experiments of Wedelstaedt (see *Cosmas* of 1899), that cement does not obtain its maximum density nor its maximum expansion until from twenty-four to forty-eight hours, for the various cements. Therefore, it does not seem wise to place a filling on a mass of cement that is going to expand and lift the gold away from the walls of the tooth; neither do I consider it wise to condense gold with the force that is necessary to use to properly condense it upon a mass of partially crystallized cement. So I do not use that method, and yet I have very little trouble with the objection of thermal conductivity. I believe that unless there is a slight hyperemia of the pulp there will be very slight discomfort, if any at all; therefore, I consider it wise in all large operations to attempt to reduce the chances of hyperemia by using the method suggested by J. Leon Williams, of flooding the cavity with alcohol, then drying with warm air and the flooding with oil of cloves; after drying again seal the tubules with any good resinous varnish and very little after-trouble will be experienced. If there is, paint the gums over the tooth with equal parts of tincture aconite and chloroform, and it will usually subside.

The difficulty of manipulation is another question and we will concede the fact that it is a difficult material to work, but shall we give up a good thing because its use requires us to overcome some difficulties? Unto the overcomer is promised the crown of life and to the overcomers in any walk of life, in any business, art or profession, is given the laurel crown of success, and to the man that will patiently study the problem of filling teeth with gold, who will be willing to be guided by the advice of others, who will profit by the mistakes as well as the successes of himself and others, will surely be given the satisfaction of success in making perfect operations with gold.

**Crystal and
Mat Golds.**

There are numerous forms of gold used in filling teeth and they all have their advocates and all have their good qualities, but I wish to utter a word of warning concerning the use of some of the

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crystal and mat forms of gold. I know that when properly used good results can be obtained with these golds, and I think that I can make as good a filling with a mat gold as I can with any of the cohesive foils, but the trouble is that we are lead to believe by some of the promoters of these golds that they can be manipulated as easily and with no more force than that required to make a good plastic filling. - Only two weeks ago a young man came into my office and told me that he was demonstrating gold. I welcomed him as I told him that I was in that line myself; so he produced his kit and with a plugger point about 5 or 6 millimeters square, he began condensing (so he called it) his gold into a cavity in a block of ivory. I told him that he could not possibly obtain any density in that way, but he said that he could with his gold; that was the beauty of it. When he had finished I asked him if he wanted me to show him the density of his gold, and he said "certainly"; so I picked up a sharp-pointed instrument, and with little force pushed it clear through his dense (?) filling. And yet that is the way those golds are being demonstrated, and men that do not know any better are following the methods taught, and the fillings so made must of necessity fail before many years. As I said before, good fillings can be made with the crystal and mat golds, but they must be carefully used and carefully condensed.

Use of Gold Foil.	I use the No. 4 foil prepared in special forms. I can not enter into a discussion of cavity preparation at this time, and yet that is of the first importance, for a good filling can not be made in a poorly prepared cavity. Suffice it to say that the cavity must be so prepared that there is perfect access to all points thereof, if we are to fill it perfectly with gold. We use the gold that comes with an ammonia protected surface and that is commercially called "soft"—a term that is misleading and one that I shall not use in this paper. I shall speak of the unannealed and annealed foils, the annealed being the cohesive foil and the unannealed the non-cohesive. The unannealed foil is used as the old operators used it and in the same manner by which they produced the beautiful and lasting operations that they were accustomed to make. Only we modify those methods by using the cohesive foils with it, to the greater ease of adaptation, and we believe with more permanent results. The unannealed foil is used in the form of cylinders, ribbons or ropes, but I prefer the cylinder method. A sheet of foil is divided into halves or quarters and folded into a narrow ribbon; this is in turn rolled upon the end of a Swiss broach into a cylinder. In using these cylinders, they are placed upon end in the cavity with the end of the cylinder exposed to the surface; for instance, if we
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were making a filling in the occlusal surface of a lower molar, we would place cylinders upon and around the walls of the cavity and condense them upon each other from the center of the cavity, leaving a space in the center, into which we would either place other cylinders and wedge them into place, following the methods of the old operators, and thus finish the filling entirely with unannealed gold, or we would fill that space with the annealed foil, according to the method advocated by the followers of Dr. Black. There are so many uses for the unannealed cylinders that a paper might well be written upon that subject alone, but in a paper of this description I must of necessity just touch upon it and leave it.

The most intractable form of gold to use is unquestionably the annealed foil, and yet when properly used it gives us such magnificent results that it more than pays for the trouble it takes to master it. It is intractable by the very property of its cohesiveness. One piece sticks to another, preventing it from going to place properly, and "bridging," thus making air spaces and points of vulnerability in the filling. In using the cohesive foil we roll our pellets into definite forms and definite quantities. Our pellets are divided into 1-64, 1-32, 1-16 and 1-8 of a sheet foil; these squares of foil are then taken, the ends turned in and the piece rolled up into a pellet. We do this that we may definitely know the amount of gold that we are condensing when we place a pellet upon the filling. For we believe that definite methods produce definite results, and we know that the haphazard methods so often used by operators in our profession are not productive of the best results.

In building up our annealed gold we place a pellet in the proper place in the cavity, and commencing in the center of the cavity condense the gold toward the wall of the cavity, using the instrument in a series of steps and held at an angle of about 45 degrees. We do this that the gold in being condensed is driven and "flowed" toward the walls of the cavity, thereby making a moisture-proof filling. If the instrument is held in such a manner that the gold is driven away from the cavity walls a leaky filling is bound to result. This is the greatest reason for leaky filling. Men do not properly understand and practice the principles of instrumentation that are necessary to produce perfect results. Proper habits and methods are as easy to acquire as improper ones, and vastly more satisfactory. So if every operator will train himself to so use his plugger that the gold is always being driven toward the wall of his cavity, he will have a great deal less trouble in the future than he has had in the past. If we understand this principle we will see the folly of preparing cavities in such a way that we have not perfect access to every part, for, unless the plugger point can reach

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every point in the cavity when so held that the lines of force will be in the right direction, the place not so reached will be imperfectly filled, and will be a point of least resistance. We use the gold that comes with an ammonia-protected surface for the reason that we know that gold must have a perfectly clean surface if it is to have perfect cohesive properties, and we know that when protected by the ammonia, no other agent can contaminate it, and that in annealing the ammonia is driven off, leaving a perfectly pure surface. This might be the case if the foil were not so protected, for there are about our operating rooms and cabinets agents that once being deposited upon the gold cannot easily be driven off, and a faulty, flakey filling would result. A very careless method that I have seen deserves a word, and that is men lighting their annealing lamps with a match that has just been ignited and scraping the match over the wick, thereby depositing upon the wick the chemicals composing the head of the match; this, or the products of this, is in turn communicated to the gold, and I believe that many cases of discolored gold fillings are the result of such carelessness.

In condensing our filling we use the hand mallet in the hands of a trained assistant. We do this because it is the easiest method of condensing gold, but more so because it is the best and most certain way. When the force necessary to condense the gold comes from a source outside of the plugger itself, it is possible to hold the plugger at an angle that it is very difficult, if not impossible, to get under any other circumstances, and then the force necessary to properly condense gold can best be obtained by the use of the hand mallet. I will not go into that subject now, but will refer those who may be interested, to the experiment of Black in the *Cosmos* for 1895, or to a paper by the author also published in the *Cosmos*.

In using the pellets we give each pellet a definite number of blows of the mallet. We do this because by laboratory experiments we have determined that it takes a definite force to condense a definite amount of gold. Therefore, we give a 1-64 sheet pellet 20 blows of the mallet; a 1-32, 40 blows; a 1-16, 80 blows, and a 1-8, 160 blows of the mallet. The mallet force is augmented by the hand pressure of from five to fifteen pounds, according to the amount of force thought wise to use in that special location. In carrying gold over any surface it should not be malleted upon until it has been built up and protected by a body of gold behind it, for if we do it will be tempered by the malleting, will draw away from the surface of the cavity and no force that we may apply afterward will drive it to place. This may be illustrated by taking a piece of pure plate gold, lay it on a flat surface and strike it in the center and then attempt to mallet it down perfectly to place. The

proper way is to build up the gold piece by piece from the angles of the cavity; and then when we come to a flat surface, as in carrying the gold over a cusp that has been ground off, build against the gold already in the cavity and thus gradually extend over the flat surface, and no trouble will be experienced. We have also found that gold does not take kindly to polished surfaces. In fact we have found it impossible to perfectly condense gold against a polished surface. Therefore, in making our fillings, we do not polish our enamel margins with disks and strips, but plane them with chisel or hoe, and are thus able to perfectly adapt the gold to those margins. It has been said that the average life of a gold filling is three years, and I have no doubt that that in the past has been correct, but knowing what we do about gold to-day, knowing what we do about the management of our enamel margins, thanks to the genius of Dr. Black; knowing what we do about the proper condensation of gold and of the proper trimming and finishing of our fillings, the life of a gold filling to-day should not be three years, but thirty or more years. A gold filling properly placed should stand as long as the tooth that contains it stands.

Since adopting the methods of making gold fillings, as taught by Drs. Black and Wedelstaedt, gold fillings have been a pleasure and delight to me, because the results have been so magnificent, and after all the old test remains true, "by their fruits shall ye know them."





Second District Dental Society.

March Meeting.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, March 9, 1908, at the Kings County Medical Association Library Building, No. 1313 Bedford Avenue, Brooklyn, N. Y.

The president, Dr. Hutchinson, occupied the chair and called the meeting to order.

The secretary read the minutes of the last meeting, which were approved.

The reports of the Committee on Public Health and Education, the Infirmary Committee, and the Membership Committee, were read and received.

Under "New Business" Dr. Hanning called the attention of the members to a recent amendment to the Penal Code, and made the following remarks:

Dr. Hanning. This amendment is in relation to the sale of certain drugs. I have been in the habit of buying cocaine from Parke, Davis & Co., and they informed me that the Board of Pharmacy had made a new rule—and that the drug trade had approved of it—to the effect that manufacturers and wholesalers would not sell directly to a physician, dentist or veterinarian. I went to a druggist in the neighborhood with a prescription, and he refused to fill it. He showed me a copy of an editorial in the *Druggist and Pharmacist*. I obtained the drug by violating the law, and thought I was justified in it. I wrote for a copy of the law, which I will read you.

(Dr. Hanning read the same.)

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The wholesale drug trade have declined, because of some ruling of the Pharmaceutical Association, to sell to dentists or physicians. That is a trade regulation. We are cut off, although the law does not say so; but we can not go to a pharmacist selling at retail and have our prescriptions filled. That is due to the agitation of the *New York Journal* and the *New York World* in reference to people who are cocain habitues. A man in Mott Street was fined one thousand dollars some time ago for selling the drug to some such person; he refused to pay the fine and was committed to prison.

We have been talking about dental education; but we ought to educate the Legislature a little bit. We should get together with the other societies and have our Law Committee ask for an amendment. Why should we trail after the physicians? The majority of dentists use cocain as much as they do, and know as much about it. It is not dignified on our part. It is a serious matter to us, as we are licensed to use cocain. The State compels the dentist to take an examination, and after he proves that he is competent, here is a law made by the same State prohibiting him from using certain drugs necessary in his practice.

I move that our Law Committee communicate with the other district societies, and seek an amendment, and that the Law Committee look up this matter before the next meeting.

Our Law Committee's function is to see to the enforcement of our present laws. We have no Committee on Legislation in our district societies. The Committee on Legislation in the State Society has jurisdiction over such matters, and that committee might receive a communication from this society on that subject.

I would move that the delegates representing the Second District Dental Society be instructed to take up this matter at the next meeting of the State Society, and get it into the hands of the Committee on Legislation.

(Motion carried.)

The president then introduced the essayist of the evening, Dr. Charles B. Isaacson, of New York, who read a paper entitled, "Lesions of the Apical Zone."

Discussion of Dr. Isaacson's Paper.

I am sure we all appreciate and have been helped by the very excellent paper we have heard to-night. Dealing as it does with cases that often baffle us, we can not be told too often that clear drainage is necessary and that a time comes when treatment of roots has reached the limit of possibility and



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surgical interference must begin. I recollect no time when this subject ever brought so clearly before us, as to-night, the folly of treating and re-treating a tooth afflicted with a chronic alveolar lesion.

In condition "A" the essayist describes a condition in which the gases of a decomposing pulp, constantly discharging through the foramen, have infected the apical zone, resulting in the formation of a pyogenic membrane, which now becomes the center of grave infection and is not reached by means of medication. Is it *not often* possible to reach this condition by medication?

Since the surgical operation of cutting into the apical zone is looked upon by patients with dread and reluctance, and by many dentists as a very serious matter, let us ask ourselves, "Is there no other way in which to minimize the number of these cases requiring surgical interference?" Can we not prevent many of them from progressing to that stage? I answer "*Yes.*" The treatment of teeth and the apical zone by the diffusion of powerful and aseptic vapors and gases furnishes the solution.

We have, until the last few years, been treating teeth empirically, and not until the introduction of sodium dioxid by Kirke, and the use of formaldehyde, hermetically sealed in a root canal, mentioned by Burcharde in 1898, and years later modified by Buckley with the addition of tricresol, have we begun to treat the subject scientifically. I believe that the number of these alveolar dental lesions could be greatly diminished by an intelligent use of any one of these preparations, to which I may add the pungent essential oils, iodoform, or any of the many germ-destroying, vapor-giving remedies with which we have succeeded for many years, in spite of the fact that we did not recognize the true way in which they acted. We now know that, hermetically sealed in a root canal, strong bacteria destroying gases are given off, which, escaping into the tubuli of the dentin and into the apical zone, drive out the mephitic gases and destroy the bacteria lodged in that area. Surely the tangible proof of the driving out of mephitic gases furnished in the bleaching of teeth should convince any doubter.

Any of these preparations is successful when properly used. By "properly used" I mean making the cavity thoroughly accessible; then, after washing out the tooth and applying the rubber dam, commence drying out the pulp canal by introducing a red hot metallic root canal point which has the necessary inherent quality of drawing these fluids toward it and evaporating them instead of driving dangerous ptomaine poisons through the apical foramen—as might be caused by introducing at this time root drills or any other form of instrumentation. After this drying,

sodium dioxid mixed with vaselin and rolled into the form of a root canal point, or liquid formalin and tricresol, are introduced and sealed in the root canals for a day or more. After this treatment the canals are then enlarged by drilling out with Buterock and Gates Gidden drills, beginning with the finest drill made and successively introducing larger ones until the canal is thoroughly accessible. Again sealing in one of these advocated medicaments for twenty-four hours we can then fill the teeth with those fillings that have been most successful in our hands.

In condition "B" the essayist describes a condition "where the pericemental membrane has gradually been detached from the root by means of the encroaching necrosis of the alveolus and serumal calcareous deposits caused by accompanying pyorrheal discharges. We will find here the apical zone seriously involved—pressure causing the pus to well up around the tooth." Even in this class of cases I often take the dying chance of devitalizing the tooth, going through the foramen with drills, followed by cocain and the usual hospital solution of carbolic acid. It is in just these cases that the utter futility of scraping and local medication is shown. Of what use can medicaments applied locally be when we have a cornucopia of pus emptying around the tooth? All the scraping we can do will not replace the lost alveolar wall! What little attachment might be on the tooth is cut away, and with the essayist, I believe and affirm that the deposits found on these teeth are the slow deposition of the decomposed fluids that flow around the tooth and are the *effect* of a disease, *not* the *cause*. Often a traumatic alveolitis is set up by wild instrumentation. Especially in gout and diabetes is there a tendency of the peripheral parts to gangrene, and we can not be too careful in handling these cases.

On the subject of administering antidotal remedies, such as whiskey, nitro-glycerin and strychnin, before taking nitrous oxid gas or cocain, I decidedly differ with the essayist. For twenty years I have always had trouble with gas patients who had taken stimulants, and to-day I insist on the patient taking a sedative first. With cocain not one in fifty cases has given me trouble, and with Beta eucain none at all. Such remedies as whiskey, nitro-glycerin and strychnin should be on hand, however, to be used when needed.

I have many times witnessed the thorough and successful work of to-night's essayist, and his paper will be a help to us all in these difficult cases.

I have listened with a great deal of interest to
Dr. F. C. Van Woert. the essay, and to the discussion following. I am a little surprised, particularly in the remarks of the

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gentleman who discussed the essay, at some of the measures adopted for the treatment of such cases. In an experience of over thirty years I have learned better than to attempt at the first sitting a thorough cleansing of a pulp canal that is putrescent. I believe a large majority of the cases are infected beyond the apex from over-instrumentation at that time. In the attempt to remove all the septic matter from the roots enough is forced through to infect the healthier tissue. I have nothing to say as to the treatment of the essayist, but I make strong objection to that advocated by the gentleman who followed him, and that is of using a red-hot needle or wire in the root canal. I supposed that had been relegated to the back shelf along with a lot of other antiquities. I would like to know from him what he expects to gain by such a procedure—what he will do to overcome the decomposition that is bound to follow a dessication of a surface like the root canal. I think it was Dr. Kells, of New Orleans, who first objected to a root canal drier. We had one from Dr. Evans, and later from Dr. Russell, both of which have been abandoned by me for a number of years, for the very reason that an unnatural dryness is a barrier to the treatment. It is almost impossible to get medication to act after such treatment. I think it would be a good thing for all of us if we knew why that red-hot needle was used. There must be some reason for it, and I am interested enough to have the doctor tell us what he gains by it, and what he does to overcome the condition resulting from its use.

I thought I explained in my paper what I did accomplish. We accomplish the drying of the root canal—the drawing up of the liquids, instead of forcing them through the foramen.

That does not answer the question. You cauterize those surfaces and close the tubuli, so there is no chance of medication of the infectious matter that is circulated through the entire structure. If that root canal is treated with a red-hot needle, beyond question the tubuli are all clogged up, and the surface burned over so that there is no chance for medication.

I differ with you. I believe you carbonize that matter and cleanse it out in the best possible way. There is no better material than fire to carbonize waste matter and products of decomposition. Your remedies permeate much better I believe than they possibly could in a wet or damp tooth. The canals have been dried out. The drying up of the living or dead matter to a smaller space and a dryer area certainly allows greater space for antiseptic gases to permeate.

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Dr. Kells proved that was impossible. I am
Dr. Van Woert. not talking of this from any personal standpoint.

I want to get at the facts, and if what the doctor says is true, we ought to know it. If, on the contrary, what Dr. Kells says is true, which I have been practicing, and which a majority of the dentists are practicing, he ought to know about it. It is not a question of what he or I may believe. It is a scientific problem to be solved, and the mere fact of stating that it is so does not prove it. If Dr. Nies has any scientific reason for such a procedure, that is what I want to find out. Clinical or personal experience goes for a great deal, but it does not combat such scientific research as Dr. Kells and other men have made. I feel very keenly about it, because I think it is of great importance to the young men particularly, and I would no more think of allowing my son, for instance, to use a hot needle in a root canal than I would think of flying.

Dr. Nies, some fourteen years ago, filled about
Dr. Molatsch. ten or twelve of my teeth that were devitalized. Several of them were ulcerated. He used the hot needle, and they have never troubled me since. In my own practice I have used it, and have had very good success and very few failures.

I came over from New York this evening to
Dr. M. T. Schamberg. hear this paper on diseases of the apical zone, for the reason that it is a subject in which I am very much interested. I have frequently to deal with the surgical conditions that exist in this region, and I do not believe you could have listened to a better paper presenting that phase of the subject. I also want to say that I do not see how a man could be so well informed upon the pathology of the part, and yet go so far wrong on the surgical treatment. I see one excuse perhaps for it, and that is that in the treatment of abscesses we accomplish much by very free evacuation, and I have known many cases to be apparently cured by a very free evacuation. That you frequently find in acute suppurative conditions. The more freely the part is evacuated, the more promptly it seems to respond. However, I will speak only in reference to chronic cases, for I intend to take up only that portion of the paper which I feel competent to discuss—I do not intend to enter into the treatment of root canals for the prevention of abscesses. I am heartily in accord with Dr. Isaacson's opinion that these cases should all be treated before they are operated on. I believe only those cases should be operated on which can not be cured and only after all other methods have failed.



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I do not agree with him in regard to the negative value of radiography. I do feel that men are at times discouraged from poor radiographs. I do not believe any radiograph which requires you to use your imagination should be taken into consideration at all. A distinct radiograph is the only valuable one—one as clear as the dissection of the part itself.

Much can be accomplished by the use of large surgical burs such as were shown, and I wish to compliment the doctor on the burs, both on account of the size and the possibility of clearance in those burs; but he makes a mistake in the failure to remove the end of the root. You only get an apparent cure—your part will not close over—a condition such as you frequently get from the extraction of an abscessed tooth. Take the root of a tooth with an abscess sac upon it, with a minute canal, which canal has been probably the greatest factor in the failure to treat that tooth originally so as to arrive at a cure; the constricted or tortuous portion retains the infection—the portion which has become so bathed with pus through suppuration that it becomes a foreign body, which the doctor spoke of as being intolerable to healthy tissue. That is the portion you must excise, if you wish a cure, and if you incise it so as to leave a little ledge, you will not have a cure. In cases where you find absorption, you have the end bathed in pus, and this portion is frequently denuded of membrane. Why is this tooth different from an imbedded or implanted tooth? For the reason that you have here healthy pericemental membrane, which membrane in time rounds these corners for you in an effort at the junction of this membrane at this healthy end of the tooth. If you fail to cut off the end of the tooth, you have practically created a condition similar to that which you might get from the retention of a bullet in the system. That bullet will remain there and not cause any great trouble until the vitality of the patient is below par, and then it manifests itself in the form of an irritant. So you get decided improvement from cutting away the alveolar process, but you do not cure it any more than by injecting medicines into this region to destroy the pyogenic membrane, and that is why so many dentists fail to cure these conditions. Nature abhors a vacuum—this space must be filled with something, and in the interim between the time of the evacuation or treatment, or closure of that tooth, there is thrown here considerable serum, which remains dormant until the patient's vitality is below par.

The point I want to bring out, and which I deem equally important, although it may be a digression from the paper, is the problem that confronts us when patients say: "Doctor, would or would not this condition

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in my jaw be cured if the tooth were removed?" And we are very likely to say, and I have said it and have found I was mistaken, that the removal of the tooth would cure the trouble.

A man came into my office last week, suffering excruciatingly. He has an edentulous upper jaw, and a radiograph disclosed a suppurating area between the roof of the mouth and the floor of the nose. The cause of it was the extraction of an abscessed tooth, permitting the socket to heal externally before it had healed within. The acute cases will not give you these results. Nature is so active in throwing off acute suppurative material that you can safely extract a tooth where the abscess is acute, and the part will drain itself before it will heal; but in chronic cases I wish to sound that note of warning.

I will pass around some radiographs showing abscesses around the apices of teeth, and I think they will be a plea for the removal of the end. I feel very strongly in regard to this matter, and I hesitated in making any adverse criticism; but I realize the reason why the doctor believes it is unnecessary to take off the end of the root, and I admit that his conditions are so much improved by a very free evacuation that you get what appears to be a cure; but you can not have a permanent cure without removing the root end.

It may be asked if you are able to get the tooth in good shape by passing medicines through, why are you not able by direct application to your openings in this portion to get good results? Here we have the peridental membrane supplying this part with nutrition. This portion of the tooth is practically dead after the membrane has been destroyed, and it has been so bathed in pus that you can not make it tolerable to healthy tissue.

After you have cleansed the canal why do you find it necessary to put in a filling? If you could get that in a healthy condition why must you insert a filling? The insertion of a filling material which hugs that tooth absolutely serves to protect that surface, and that is one reason why the filling must be properly applied. If you were able to protect this end of the tooth by some means, it might be tolerated by the tissue; but I do not know of any foreign substance that would be any more acceptable to this tissue than would be that end of the tooth. The end of the tooth is just as much of an irritant when the abscess has been curetted as would be the piece of filling material that had been projected through.

It seems strange to me in this age that there **Dr. Wilbur M. Dailey.** should be such a hue and cry raised about a pulpless tooth where the pulp has been devitalized and putrescence has taken place. There have been in the last few years a

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number of men who have gone into the study of dental medicine in a scientific manner. Dr. Callahan I would refer to first, and Dr. Buckley afterward. By the use of the medicaments advised by them there is no question in my mind but that we have at our command a scientific means of treating pulpless teeth, by which, in nine hundred and ninety-nine out of a thousand cases, you do not get fistulous tracts. I believe it is due in almost all cases to a foreign substance placed there by the operator. Even in extreme cases, by the methods we have at hand, by the Callahan or Buckley methods, we can treat teeth without obtaining abscesses and getting fistulous openings. I would strongly advise all teeth with fistulous openings to be treated prior to surgical operation, because if treated in the proper manner the fistulous opening will soon cease to exist.

The essayist spoke of using some paste as a permanent root filling. It is astonishing the number of fistulous openings you will find with teeth treated in that manner. There is a certain amount of disintegration and absorption of the paste which will leave a concave space at the apical end, and that would excite a certain amount of pericemental disturbance, and you would have pus formed and a fistulous tract.

I am very glad to have the opportunity of trying to make clear what I said.

Dr. Isaacson.

I said very distinctly I was treating chronic alveolar abscesses. I made no mention about medication. I said a paste was used as a dressing, not as a filling, so that is *ex cathedra*, and I rule that out.

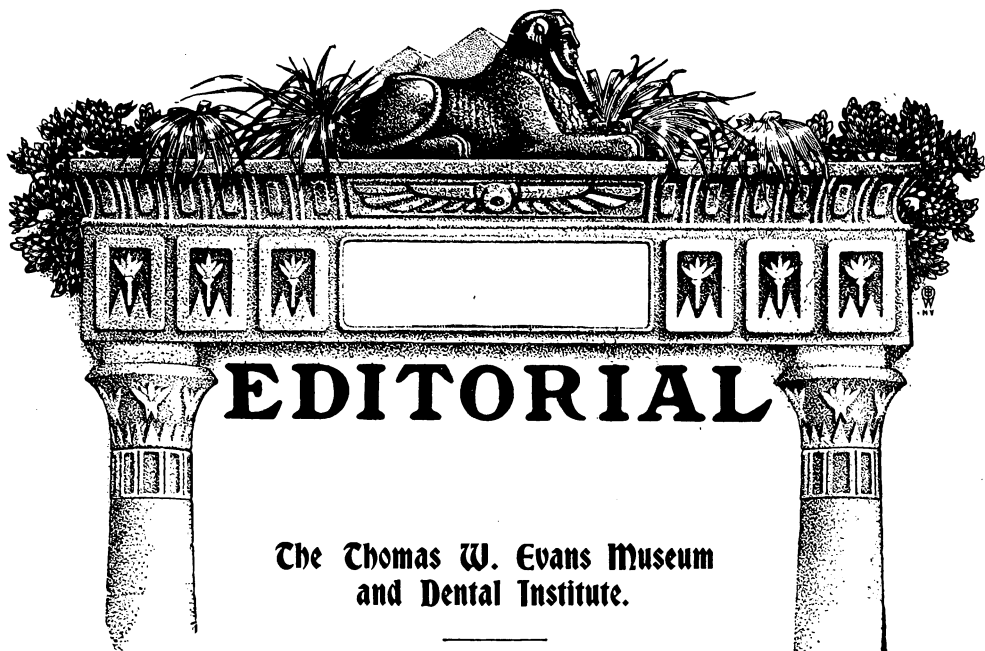
Now let me ask, What have we? We have pus formed in this area. What can it do? It can do two things—find an opening either through the tooth or through the line of least resistance—through the alveolar wall. What next? If it continues, the pericementum is detached, and we have a pyogenic membrane, and when that is formed, I maintain the apical area is infected. For twenty years I have been treating teeth, and I have succeeded fairly well. I have not seen the success with cutting off the roots. Many times cases have come to me where the teeth have become exfoliated, and I have pulled them out. In some instances there is such a thing as hypercementosis, which may be the cause. I think Dr. Schamberg has the cart before the horse. The root is no longer the exciting cause—the bone itself is infected, and when he goes into that area and amputates that root, he gets clear drainage, which should have been done at the beginning. My proposition was where there is a distinct fistulous opening and a continued discharge. I did not discuss the prevention—I said very clearly at the beginning that proper medication might prevent a fistulous opening, and might prevent an infection of the

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apical zone. I assumed only those chronic cases where there was a fistulous opening, with a distinct discharge, and as nature is trying to make an opening, so must we. If we enlarge it and clean it out, we do a great deal.

As to the extraction of the teeth, as I mentioned in my article before the Alumni Society—particularly in the cases where the pyogenic membrane has been retained—you must look at this wound in the mouth as you would a wound in any part of the body; but there is no such thing as an aseptic condition in the mouth—there is no way of draining it and keeping it clear.





The dental profession will be pleased to learn that there seems to be some probability, in the near future, of the founding of a Dental Institute, such as was projected by the will of the late Dr. Thomas W. Evans. Various men interested in dental education have recently received a letter, of which the following is a copy:

DEAR SIR:

The Thomas W. Evans Museum and Institute Society is considering the best method of carrying out the purposes of the will of Dr. Evans under the provisions, which are as follows:

"I give:—

"Primo.—Unto the Thomas W. Evans Museum and Institute Society, a corporation able to receive, hold and transfer property in France and in the State of Pennsylvania, to be created and incorporated if possible before my death under the laws of the State of Pennsylvania by preference or under the laws of any other State of the United States of America where such incorporation may be made, absolutely and forever, under the reserves above mentioned and upon the charges, conditions and obligations imposed in this article.

"I direct that said corporation shall continue to carry on under the same regime as established by me any museum and institute which have been founded by me at the City of Philadelphia, in the State of Pennsylvania aforesaid.



"In case no such museum or institute shall have been founded by me before my death, I direct the said corporation to use the property situated at the corner of Spruce and Fortieth Streets, in West Philadelphia, City of Philadelphia, and State of Pennsylvania aforesaid, which is the property where my dear father and mother lived and died, and where I myself was much as a boy and my sister and husband died.

"Together with all grounds touching or adjoining said property which I may have bought during my life or of which I may be possessed at the time of my death.

"And for the purpose of such museum and institute I direct that upon said property and said touching or adjoining additions said corporation shall erect sufficient and suitable buildings, fire proof and burglar proof, of artistic and refined beauty, to be called the Thomas W. Evans Museum and Dental Institute.

"In the event that I should not acquire during my life properties adjoining and touching my property situated at corner of Spruce and Fortieth Streets, West Philadelphia, City of Philadelphia, Pennsylvania, then I direct that said corporation shall procure the adjoining property now inhabited by the family of M. Brown, or representative, if it can be obtained at a just and reasonable price for the neighborhood, and shall construct or establish The Thomas W. Evans Museum and Dental Institute on the original lot and purchased addition, or if such adjoining property is not acquired, then in such a case to erect or establish The Thomas W. Evans Museum and Dental Institute upon the property as it is now, with the house and lot corner of Spruce and Fortieth Streets, in the City of Philadelphia aforesaid.

"As to the Museum and Dental Institute above mentioned, I desire that the museum be conducted as follows, to wit:

"As to the Dental Institute I desire it to be conducted in a way similar in regime as such institutions of learning are conducted in Philadelphia, and not inferior to any already established.

"I direct that the said corporation shall apply so much of the remaining income and profits of my estate as shall be necessary to successfully keep, maintain and carry on and improve the same and render it the more important, and if there shall be a surplus of income after paying all its expenses, remunerations, salaries, I request said corporation to apply said surplus to the education of such deserving students of dentistry of my native State of Pennsylvania as it deems best and advantageous to help striving boys to get their education.

"I direct that in said Philadelphia Museum shall be placed all objects of art, pictures, paintings, statuary, jewelry and all objects presented to me by royalties, all books, manuscripts, all original letters and copies of royal letters, autographs and of other personalities or distinguished or celebrated people, and all other objects not especially disposed of. All the above shall be catalogued and deposited in the museum. The above objects which I have mentioned must be placed in an absolutely extra fire-proof room and positively burglar proof, even at an extra cost, and there they are to remain as long as the museum exists."



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The Board of Trustees would appreciate your views upon this general subject, if you will be kind enough to give them.

Asking that they be sent to me within the next two weeks, I am,
Yours very truly,

J. LEVERING JONES,
Chairman Executive Committee.

It is evident from the wording of the will that the decedent intended the "Museum and Dental Institute" to be a separate institution, though similar and not inferior to the other colleges in Philadelphia. Would it not be nearest the wishes of Dr. Evans if a magnificent institution of learning could be founded which would be entirely distinctive in the character of its work? The following brief suggestion for a truly unique dental institute is herewith tendered to the present trustees.

**What Dentistry
Needs.**

The dental profession is at present in need of three things: First, better prepared dental students; second, post-graduate education for practitioners and young graduates; third, systematic scientific investigations of many problems. Why should not the Evans Dental Institute provide all of these? Why should it not furnish preliminary and post-graduate education as well as a continuous research work?

A great many, indeed far too many, students are matriculated not only with inadequate preliminary education, but with a total unfitness for the practice of dentistry. The Evans Dental Institute could establish a single course, which not only would bring the candidate up to the proper educational standard for matriculation into a dental college, but at the same time might provide a manual training which would better enable him to learn the practical side of dentistry. During such a term many young men undoubtedly could be advised to abandon the idea of studying dentistry, and to enter a field of work which their preceptors might discover them to be better fitted for.

In regard to post-graduate work, there is at present a great demand for such teaching for men who graduated before many of the present methods had been perfected or had come in vogue. But the greatest need for a real post-graduate dental school is born of the fact that dentistry is rapidly dividing up into specialties. Already we have "schools" which teach these "specialties." But the Evans Dental Institute, if managing post-graduate courses, would really be providing the "fourth college

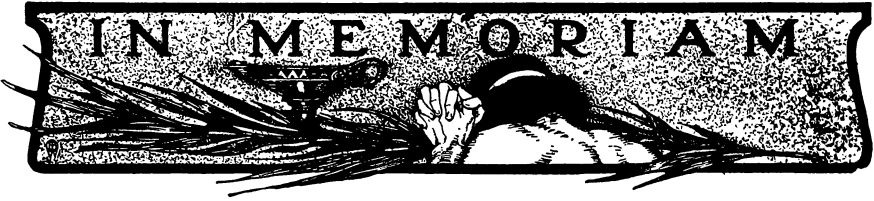


year," for which so many have clamored, except that this would embrace elective courses of study.

Lastly, with such an institution as has been but crudely outlined, and with a real dental museum as its annex, where better could opportunity be found for a real study of many of our most perplexing problems? Not only could the institute itself inaugurate much original research work, but by opening its laboratories to all earnest students, many scientifically inclined would be glad to spend much time within its portals, seeking for the truths of dental science.

Dental Orthopedia—Case.

We have on our table the long expected work on the treatment of irregularities by Dr. Calvin S. Case, the title of which is "Dental Orthopedia." The volume is a superb example of the bookmakers' art, the paper, press work and engravings, all being above criticism. Dr. Case's contribution to the literature of the art will always remain a classic, registering as it does the ripe experience of one who has been an orthodontic specialist for practically a lifetime. Dr. Case's views will be received with respectful attention even by those who hold the most opposite opinions, and the book will be instructive to practitioners regardless of the special methods they may have heretofore favored. A critique of the book will appear later.



Dr. Stephen Thomas Beale.

Died, at his residence, Tulpehocken Street, Germantown, Philadelphia, Friday morning, November 22, 1907, after a lingering illness, Dr. Stephen Thomas Beale, in the sixty-fourth year of his age.

The announcement of the death of Stephen Thomas Beale, although not wholly unexpected, was received with expressions of deep sorrow by the wide circle of friends to whom his estimable personal qualities had endeared him. While he had been a patient sufferer for a long time, his illness was not regarded as alarming until ten days previous to his demise, when a decided change for the worse became apparent, and he sank rapidly. Although physically weak, his mind remained unimpaired to the latest moment, dying in the full fruition of his mental powers, surrounded by his family and near relatives, death came quietly and peacefully.

Dr. Beale was born in Philadelphia, Pa., December 7, 1844, and was educated in private and public schools of his native city, immediately after which he began the study of dentistry under his father, the late Stephen Thomas Beale, M.D., D.D.S., whose laboratory was one of the foremost schools of instruction in this city prior to the establishment of dental colleges, where his natural mechanical ability enabled him to acquire a valuable and thorough knowledge in the various arts of prosthetic technique, and he soon became proficient in the manufacturing of porcelain carving for plain and sectional block teeth, also refining and smelting of precious metals, the making of metallic plates, the manufacturing of alloys for filling purposes, nitrous oxid and the hardening and tempering of steel for various styles of excavators; all of which work was formerly carried on in his father's laboratory, and proved in later years of inestimable value to him. He matriculated at the Philadelphia College of Dental Surgery, and was graduated therefrom in the class of 1866-67, and thereafter was associated for years with his father, whose extensive practice covered a period of over fifty years, and to which he and his brother, the late Alonzo Potter Beale, D.D.S., lecturer and demonstrator on prosthetic technique at the Penn-



sylvania College of Dental Surgery, and his eldest son, Rupert Griscom Beale, D.D.S., eventually succeeded. By careful and conservative methods he maintained the high standard of work established by his father, and, at the death of his brother, the arduous duties of his practice increased twofold. His remarkable energy and indomitable will, combined with his marvelous powers of endurance, enabled him to follow his profession closely and conscientiously. His rapidity and capacity for work were surprising. He was a sympathetic operator, gifted with a sensitive, gentle touch. He was skilful, enthusiastic, progressive, liberal in imparting knowledge to those who sought his advice. Doubtless the close and earnest pursuit of his profession was the prime factor in undermining his health. About five years since, in accordance with the advice of his physician, Dr. John H. Musser, he limited his practice to three hours a day, and finally retired from professional work in the summer of 1906. Although not active in dental societies, yet his connection with the profession from the time of his entering upon its arduous duties has been one of entire devotion and zeal in the discharge of its obligation, and in furthering its advance to a proper place among the liberal professions. As an operator he upheld the higher artistic ideals, and was gifted with more than ordinary ability. His large and lucrative practice covered a period of thirty-five years, during which time he enjoyed the confidence of a large clientele.

Dr. Beale came from good English Quaker and Scotch Covenanter stock. He was born at 335 Walnut Street (present No. 1117). He was the son of Stephen Thomas Beale, M.D., D.D.S., a celebrated physician and dentist, one of the founders of the Pennsylvania Association of Dental Surgeons, and also of the Pennsylvania College of Dental Surgeons. His office has had a continuance of over sixty-eight years, the practice having been carried on by father, two sons and at present by three grandsons—Dr. Rupert Griscom, Dr. Clifford Donaldson and Dr. Earle Thomas Beale. His paternal grandfather was one of Wellington's soldiers, and his maternal great-grandfather was Capt. William Donaldson, a brother of Arthur Donaldson, who, in 1776, laid the Chevaux de Frise in the Delaware to prevent the British from coming up the river to Philadelphia. On his mother's side he was also descended from Andrew Griscom, one of the first purchasers of land from William Penn, and from Corporal Mark McCord, who was wounded in the battle of Germantown, and died at Trenton from his wounds. He was a great-grandnephew of Betsy Ross, maker of the first American flag, and his patriotism was shown when, as a lad, he enlisted in the Emergency Corps of 1863 during the Civil War. He was sworn into the United States service in the 33d Pennsylvania Volunteers "Blue Reserve," and was

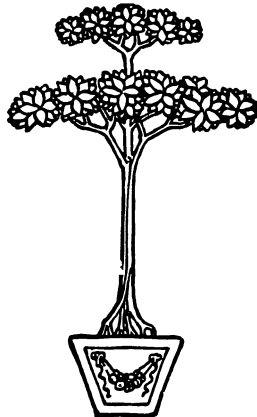
ITEMS OF INTEREST

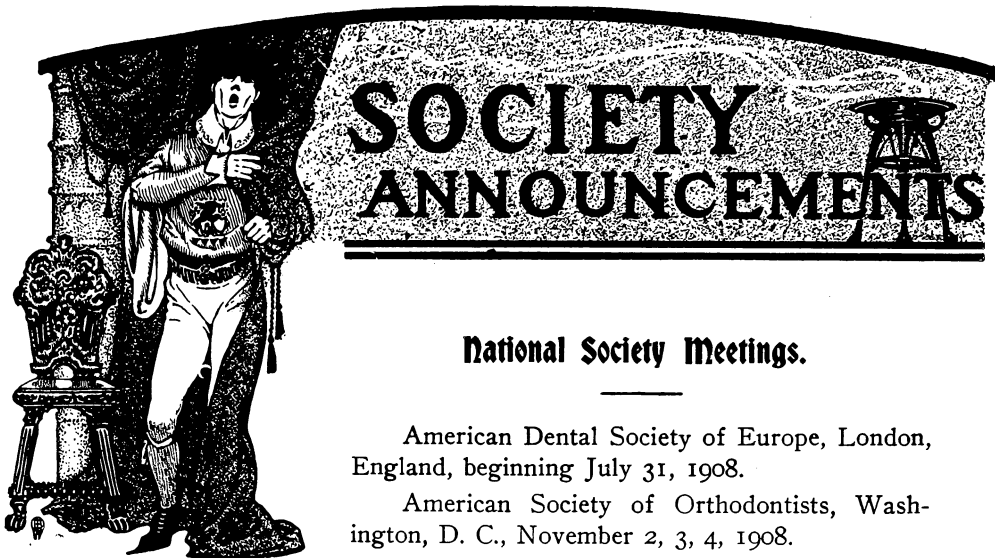
under fire as a corporal in several engagements at Oyster Point, Carlisle and Hagerstown; his blouse sleeve being shot through at the Hagerstown skirmish caused his name to be incorrectly reported among the list of wounded.

Dr. Beale married Isola Earle Smith, who is a second cousin to Lord Julian Pauncefote, the late Ambassador at Washington. He and his wife and family enjoyed the delights of travel, reserving two months during each summer for recreation. He was especially fond of sea voyages, and made numerous trips abroad, visiting the famous galleries of art in London and on the Continent. He also traveled many times to Canada and Newfoundland, and crossed the United States from the Atlantic to the Pacific.

In private life Dr. Beale was a most warm-hearted and genial companion, modest in disposition, steadfast in friendship, of irreproachable character, generous and noble in every impulse of his nature, philanthropic, kind and courteous, and was honored, respected and loved by all who knew him. He leaves a circle of warm friends and a fond and loving family to mourn his loss. He is survived by his widow, three sons and two daughters.

In his death the profession has lost a most efficient and worthy member.





National Society Meetings.

American Dental Society of Europe, London, England, beginning July 31, 1908.

American Society of Orthodontists, Washington, D. C., November 2, 3, 4, 1908.

National Association of Dental Examiners and the National Association of Dental Faculties, Back Bay, Boston, Mass., July 24, 25, 27, 1908.

National Dental Association, Boston, Mass., July 28, 29, 30, 31, 1908.

State Society Meetings.

California State Dental Association, San Francisco, Cal., June 9, 10, 11, 1908.

Colorado State Dental Association, Boulder, Colo., June 18, 19, 20, 1908.

District of Columbia Dental Society, Baltimore, Md., June 4, 5, 6, 1908.

Georgia State Dental Society, Augusta, Ga., June 2, 3, 4, 1908.

Indiana State Dental Association, Indianapolis, Ind., June 4, 5, 6, 1908.

Kentucky State Dental Association, Louisville, Ky., June 2, 3, 1908.

Maryland State Dental Association, Baltimore, Md., June 4, 5, 6, 1908.



ITEMS OF INTEREST

Michigan State Dental Society, aboard steamer "Mackinaw" en route to the "Soo," Mackinaw Island and return, June 10, 11, 12, 13, 1908.

Minnesota State Dental Association, St. Paul, Minn., June 8, 9, 10, 1908.

Mississippi Dental Association, Jackson, Miss., June 9, 10, 11, 1908.

New Jersey State Dental Society, Asbury Park, N. J., July 15, 16, 17, 1908.

New York State Dental Society, Albany, May 7, 8, 9, 1908.

Ohio State Dental Society, December, 1908.

Oklahoma State Dental Association, Muskogee, Okla., June 8, 9, 10, 1908.

Pennsylvania State Dental Society, Philadelphia, Pa., June 30, July 1, 2, 1908.

South Dakota Dental Society, Lead, S. D., July 23, 24, 1908.

Southern Illinois Dental Society, Greenville, Ill., October 27, 1908.

Texas State Dental Association, Dallas, Texas, June 11, 12, 13, 1908.

Virginia State Dental Association, Richmond, Va., July 14, 15, 16, 1908.

Wisconsin State Dental Society, LaCrosse, Wis., July 21, 22, 23, 1908.

National Dental Association.

The twelfth annual meeting of the association will be held in Boston on July 28 to 31, inclusive, and promises to be one of the most important in the history of the society. It is twenty-eight years since our national society has held a meeting in New England, and it is confidently predicted that the attendance and interest of this gathering will surpass that of any previous session. Hotel Somerset, on Commonwealth Avenue, has been selected as headquarters for the association, and where all meetings will be held, including also those of sections. The clinics will be held in Tuft's College Dental School, on Huntington Avenue, on the forenoons of Wednesday and Thursday.

Rates of Hotel Somerset.—Two in room with bath, \$4.00 per day. One in room with bath, \$3.00 per day. Two in room without bath, \$3.50 per day. One in room without bath, \$2.50 per day.

For reservations, etc., apply to the chairman of the local committee of arrangements, Dr. W. E. Boardman, 419 Boylston Street, Boston.

SOCIETY ANNOUNCEMENTS

Membership in the association is limited to delegates from State societies, but a most cordial invitation is extended to all reputable dentists to attend the meeting.

DR. WILLIAM CARR, President,
35 W. 46th Street, New York.
DR. CHARLES S. BUTLER, Secretary,
Buffalo, N. Y.

CLINIC SECTION.

A month nearer the convention of the N. D. A. finds the clinic programme near its completion.

Professional men who expect to attend the July meeting may easily recognize the fact that this special feature will be well worth a trip to Boston.

Returns have yet to come in, but that the profession may have an earnest of good things to come, a partial programme has been arranged for publication.

It will be seen that those interested in any one or all of the operations in metal fillings, silicates, porcelain inlays and restorations, crown and bridge work, prosthetics and dental surgery will find something of helpful value. The surgical clinics and laboratory exhibits will be of high order. The other groupings of clinics are in the hands of competent men, who will contribute to the general interest attending a N. D. A. clinic.

CHAIR CLINICS.

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| Ainsworth, George C., D.D.S..... | Boston, Mass. |
| 1. Contour gold filling—matrix without preliminary separation. | |
| 2. Will demonstrate the making and application of his Automatic Spreading Appliance, as used in orthodontia. | |
| Annis, E. R., D.D.S..... | Winnebago, Minn. |
| Gold foil and cement used in making contour amalgam fillings. | |
| Argue, J. E., D.D.S..... | Red Lake Falls, Minn. |
| Casting a Richmond crown without breaking facing and casting cap pin and attachment all in one cast. | |
| Baker, George T., D.D.S., D.M.D..... | Boston, Mass. |
| Orthodontia, showing appliances in the mouth. | |
| Ball, F. E., D.D.S..... | Fargo, N. D. |
| Pressure anesthesia. | |
| Ballachey, F. A., D.D.S..... | Buffalo, N. Y. |
| Ascher's enamel filling. | |
| Beemer, Horace I., D.D.S..... | Newton, N. J. |
| Gold filling: Distal surface of upper first bicuspid according to the methods of Dr. Black. | |
| Bowles, Shirley W., D.D.S..... | Washington, D. C. |
| Use of the Greenough microscope at the dental chair. | |
| Burkhart, A. P., M.D.S..... | Buffalo, N. Y. |
| Obtunding sensitiveness. | |

ITEMS OF INTEREST

- Carlson, K. Edward, D.D.S. St. Paul, Minn.
Gold filling bicuspid or mesio incisal.
- Carr, Isaac N., D.D.S. Durham, N. C.
Ascher's artificial enamel.
- Chilcott, Langdon S., D.D.S. Bangor, Me.
Combination gold filling. Cavity lined with non-cohesive gold and filled with cohesive gold.
- Conzett, J. V., D.D.S. Dubuque, Iowa
Gold filling.
- Cudworth, William H., D.D.S. Milwaukee, Wis.
Porcelain Inlay, Jenkins.
- Curtis, G. Lenox, M.D., D.D.S. New York City
Surgery.
- De Mille, P. E., D.D.S. Baldwin, Wis.
New method bridge work.
- Gaylord, Albert N., D.D.S. New York City
Method of reducing bulk of wax models in inlay work.
- Gough, Frank A., D.D.S. Brooklyn, N. Y.
Orthodontia—plaster impression.
- Greene, J. W., D.D.S. Chillicothe, Mo.
Preventive dentistry using nitrate silver, etc.
- Green, Maurice, D.D.S. New York City
Ethyl Chlorid as a general anesthetic.
- Head, Joseph, D.D.S., D.M.D. Philadelphia, Pa.
Two anterior approximal fillings, porcelain.
- Hetrick, Frank O., D.D.S. Ottawa, Kan.
Gold filling inlay.
- Hutchinson, R. G., Jr., D.D.S. Brooklyn, N. Y.
Surgical treatment of pyorrhea.
- Jefferis, C. R., D.D.S. Wilmington, Del.
Ascher's artificial enamel.
- Jungman, J. W., D.D.S. Cleveland, Ohio
Oral prophylaxis.
- Kelsey, James H., D.D.S. Erie, Pa.
Oral prophylaxis and treatment of pyorrhea alveolaris.
- Land, C. H., D.D.S. Detroit, Mich.
The artificial enameling of vital teeth.
- Luttrupp, Knut J., D.D.S., D.M.D. Boston, Mass.
Porcelain inlay.
- Luttrupp, S., D.D.S., D.M.D. Boston, Mass.
Contour gold filling.
- McAlpin, A., D.D.S. Bradford, Pa.
Anchor screws with "Ascher's Enamel" and plasters.
- McMillen, D. J., M.D., D.D.S. Kansas City, Mo.
Non-cohesive gold.
- Mitchell, William H., D.D.S. Bayonne, N. J.
Vibration and dental massage.
- Purvis, Robert, D.D.S. Camden, N. J.
Local anesthetic extracting.
- Rietz, Hugo C., D.D.S. Boston, Mass.
Contour gold filling.

SOCIETY ANNOUNCEMENTS

Riggs, Charles H., D.D.S.	Hartford, Conn.
Immediate root filling.	
Rose, Charles L., D.D.S.	Spokane, Wash.
Cast posts for pinless crowns.	
Rundle, V. M., D.D.S.	Newton, N. J.
Gold filling, mesial surface, upper bicuspid, using Dr. Black's method.	
Ryan, Clarence M., D.D.S.	Syracuse, N. Y.
Gold filling.	
Savage G. Arthur, D.D.S.	Worcester, Mass.
1. Jacket crowns.	
2. (a) Restoration of central incisor in porcelain.	
(b) Gold inlay.	
Schamberg, M. I., M.D., D.D.S.	New York City
Dental radiography.	
Stanley, Ned A., D.M.D.	New Bedford, Mass.
Treatment of case of pyorrhea, using the "Carr Instruments."	
Starbuck, A. W., D.D.S.	Denver, Colo.
Porcelain Inlay.	
Stevenson, G. E., D.D.S.	Liberty, Ind.
Gold filling, using Keeton gold.	
Thorpe, Burton Lee, M.D., D.D.S.	St. Louis, Mo.
Filling of approximal or labial cavity with translux enamel.	
Tompkins, Henry H., D.D.S.	Utica, N. Y.
The construction of porcelain crowns without the use of models.	
Tuttle, Charles P., D.D.S.	Camden, N. J.
Obtunding sensitive dentin with Meyer spring.	
Weeks, S. Merrill, D.D.S.	Philadelphia, Pa.
Orthodontia.	
White, William A., D.D.S.	Phelps, N. Y.
Ascher's artificial enamel.	
Work, C. M., D.D.S.	Ottumwa, Iowa
Porcelain inlay.	

TABLE CLINICS.

Abbott, C. Edson, D.D.S.	Franklin, Mass.
(a) Asbestos and alcohol investment for crowns, small bridges, etc.	
(b) Gold and amalgam fillings over soft cement, condensed under linen tape.	
(c) Pinned Richmond crowns for fractured roots.	
(d) Ligature wrapped with unvulcanized rubber for cervical gum retraction.	
Albee, E. H., D.D.S.	Concord, N. H.
Quickly made splint for accident cases.	
Albray, Raymond A., D.D.S.	Newark, N. J.
Splint for use in pyorrhea.	
Baldwin, H. P., D.D.S.	Manchester, N. H.
(a) Plate strengthener for partial lower plates.	
(b) Case abnormal teeth.	
Blaisdell, Edwin C., D.M.D.	Portsmouth, N. H.
Easy way to get into bicuspid and molar canals.	

ITEMS OF INTEREST

- Bogue, E. A., M.D.....New York City
Orthodontia for children.
- Bordnen, Charles M., D.D.S.....Shenandoah, Pa.
Simple method of banding crowns.
- Bowers, George A., D.D.S.....Nashua, N. H.
Cast fillings and bridges, using amateur outfit.
- Bridge, Walter G., D.M.D.....Boston, Mass.
A practical demonstration with the blowpipe.
- Brown, Byron, D.D.S.....Brooklyn, N. Y.
Porcelain crowns.
- Bush, Roy Allen, D.D.S.....Worcester, Mass.
Showing method of preparing plaster cast to obtain the greatest
amount of adhesion to the mouth of vulcanite denture.
- Bradshaw, C. A., D.D.S.....Buffalo, N. Y.
New cast inlay machine.
- Clapp, Harold M., D.D.S.....Utica, N. Y.
Orthodontia.
- Cook, William F., D.D.S.....Jersey City Heights, N. J.
Banding Logan crowns.
- Cross, Harold DeW., D.M.D.....Boston, Mass.
Anatomical articulation.
- Cruzen, E. E., D.D.S.....Baltimore, Md.
Porcelain work.
- Curtis, W. S., D.D.S.....Montpelier, Vt.
One tooth removable bridge, in connection with gold inlays.
- Custer, L. E., D.D.S.....Dayton, Ohio
Electrical casting of Taggart inlay.
- Dameron, E. P., D.D.S.....St. Louis, Mo.
Possibilities of casting in metals.
- Delabarre, Frank A., D.D.S., M.D.....Boston, Mass.
Orthodontia model.
- Evslin, Leo E., D.D.S.....Peoria, Ill.
The Evslin interchangeable teeth.
- Faxon, F. S., D.D.S., D.M.D.....Brockton, Mass.
Treatment of pyorrhea and use of practical splint for loose tooth.
- Fritz, Gustav E., D.D.S.....Peoria, Ill.
The Evslin bridgometer.
- Gerrish, C. H., D.D.S.....Exeter, N. H.
Crowns, napkins and non-cohesive gold.
- Gordy, A. P., D.D.S.....Columbus, Ga.
Orthodontia.
- Greene, J. W., D.D.S.....Chillicothe, Mo.
Absolute test impressions and articulations.
- Greene, F. A., D.D.S.....Geneva, N. Y.
Original method of starting gold fillings in proximal cavities.
- Grievess, C. J., D.D.S.....Baltimore, Md.
The McNeill bridge repair.
- Griswold, Gilbert M., M.D.S.....Hartford, Conn.
The burnished "Co-ad" filling.

SOCIETY ANNOUNCEMENTS

- Hardy, Charles D., D.D.S. Summit, N. J.
Simple inexpensive device for casting gold inlays.
- Hardy, George E., M.D., D.D.S. Baltimore, Md.
Bridge repair.
- Harting, H. H., M.D. Boston, Mass.
X-ray in dentistry.
- Harrison, A. M., D.D.S., A.M. Rockford, Ill.
Silicate of zinc lining for porcelain inlays.
- Hough, Willie L., D.D.S. Laconia, N. H.
Removable and fixed bridge.
- Hulick, William O., D.D.S. Cincinnati, Ohio
Bridge on converged teeth.
- Jameson, Norman L., D.D.S. Philadelphia, Pa.
Casting gold inlays and crowns.
- Johnson, E. A., D.M.D. Boston, Mass.
X-ray.
- Jones, Charles F., D.D.S. Elizabeth, N. J.
Oral deformities and fractures. Practical cases.
- Kelsey, Harry E., D.D.S. Baltimore, Md.
Orthodontia.
- Ketner, Frank W., D.D.S. Hudson, N. Y.
To be announced.
- Lansing, A. L., D.D.S. New York City
To be announced.
- Le Cron, D. O. M., D.D.S. St. Louis, Mo.
Cavity preparation for gold and porcelain inlays.
- Low, Frank W., D.D.S. Buffalo, N. Y.
Systematic medication to prevent the decay of teeth of women during pregnancy.
- McCarthy, John W., D.D.S. Holyoke, Mass.
Anatomy of the head.
- McNulty, Thomas P., D.D.S. Gouverneur, N. Y.
The re-adapting of ill-fitting dentures.
- McMillen, D. J., M.D., D.D.S. Kansas City, Mo.
Inlay cavity preparation.
- Miller, Chester C., D.D.S. Plainfield, Ind.
The marks of congenital syphilis.
- Niles, Edward S., D.D.S. Boston, Mass.
Burrillium silicate fillings.
- Onderdonk, T. W., D.D.S. New York City
Method of obtaining wax models for cast inlays.
- Palmer, Stephen, D.D.S. Poughkeepsie, N. Y.
Gold or porcelain, which?
- Parkhurst, Charles E., A.B., D.M.D. Somerville, Mass.
To be announced.
- Payson, Will S., D.D.S. Castine, Me.
Anchorage of alloy fillings and the matrix.
- Peeso, Fred. A., D.D.S. Philadelphia, Pa.
Removable bridge work and different forms of abutments for same.
- Porter, Ross, D.D.S. Oil City, Pa.
Making wax impressions for gold castings.

ITEMS OF INTEREST

- Pullen, H. A., D.D.S.....Buffalo, N. Y.
Orthodontia.
- Ridout, J. B., D.D.S.....St. Paul, Minn.
Cast novelties.
- Robinson, J. A., D.D.S.....Morrisville, Vt.
Ingenuous contrivances for making engine belts.
- Sawyer, A. J., D.D.S.....Manchester, N. H.
(a) Removable bridgework.
(b) One tooth bridge.
(c) Banded root crown.
- Seymour, Robert, D.D.S.....Philadelphia, Pa.
Casting gold inlays, using the Seymour machine.
- Schermerhorn, A. R., D.D.S.....Syracuse, N. Y.
Porcelain crowns.
- Shannon, G. H., D.D.S.....Cambridge, N. Y.
The use of the automatic right-angle mallet.
- Simpson, O. H., D.D.S.....Dodge City, Kan.
A new crowning system.
- Slack, W. F., D.D.S.....Manchester, N. H.
New method of applying force in orthodontia.
- Smith, D. D., D.D.S.....Sandusky, Ohio
Two accidents and a way out of each.
- Stang, Robert H. W., D.D.S.....Bridgeport, Conn.
Orthodontia.
- Stanton, Frederick L., D.D.S.....New York City
The relation of rhinology to orthodontia.
- Steeves, Alice M., D.D.S.....Boston, Mass.
Dental ligatures and wedges.
- Stewart, Lee K., D.D.S.....Chicago, Ill.
Large gold inlays.
- Taylor, Levi C., D.D.S.....Hartford, Conn.
Junior hygienic fillings.
- Tousey, Sinclair, M.D.....New York City
X-ray and ultra violet ray in dentistry.
- Tucker, E. J., D.D.S.....Roxbury, N. C.
To be announced.
- Weston, W. Harry, D.M.D.....Nashua, N. H.
Simple gold and platinum inlays.
- Wheeler, C. W. B., D.D.S.....New York City
Orthodontia (Jackson system).
- Wilbur, C. A., D.D.S.....Pawtucket, R. I.
Cast gold inlays.
- Young, Douglas H., D.D.S.....Attica, N. Y.
A method of treating prominent alveolar process.
- Young, J. Lowe, D.D.S.....New York City
Orthodontia.
- Young, W. B., D.D.S.....Jacksonville, Ill.
Some of the uses of a casting machine.



SURGICAL.

- Chenery, W. E., A.B., M.D. Boston, Mass.
Surgical, in infirmary, with lecture in amphitheater, using projection apparatus.
- Fillebrown, Charles D., M.D. Boston, Mass.
Cleft palate.
- Reynolds, C. H., D.D.S. Clintondale, N. Y.
Arresting buccal hemorrhage without the application of liquid hemostatics.
- Schamberg, M. I., M.D., D.D.S. New York City
Oral surgery.
- Smith, M. C., M.D., D.D.S., D.M.D. Lynn, Mass.
To be announced.
- Strout, B. H., D.D.S. Taunton, Mass.
Epulis.
- Teter, C. K., D.D.S. Cleveland, Ohio
An oral operation under prolonged nitrous oxid and oxygen anesthesia.

LABORATORY EXHIBITS.

- Dearborn, G. V. N., A.M., M.D., Ph.D. Boston, Mass.
Physiology exhibit and demonstrations in my laboratory.
- Bates, George A., M.Sc., D.M.D. Auburndale, Mass. }
- Leary Timothy, M.D. Roxbury, Mass. }
- The common bacteria of the mouth cavity and lesions arising therefrom.
- Smith, H. Carleton, Ph.G. Boston, Mass.
Saliva.

The complete programme with full titles, dates and places of meeting, with all necessary information with regard to the clinics, will appear in the July journals.

GEORGE E. SAVAGE,
Chairman Clinic Section.

New Jersey State Dental Society.

On account of the large increase in clinics and exhibits the New Jersey State Dental Society have been compelled to secure larger quarters than heretofore, and the Executive Committee have been able to secure the beautiful new Casino situated on the Beach Front, with excellent accommodations for clinics, exhibits, and meetings, with abundant space, perfect light and a delightful ocean breeze.

ITEMS OF INTEREST

The Casino is the most superior meeting place in Asbury Park, and within easy access from trolleys and trains. To realize the beauties and charms of this new meeting place will necessitate attendance at the annual meeting of the New Jersey State Society.

Meeting commences, as heretofore announced, July 15, and continues through the 16th and 17th.

CHARLES A. MEEKER, D.D.S., Secretary.

29 Fulton St., Newark, N. J.

Clinicians for the Indiana State Dental Meeting, June 1908.

Dr. Truman W. Brophy, Chicago, Ill., "Cleft Palate Operation."

Dr. F. B. Morehead, Chicago, Ill., "Surgical Clinic."

Dr. J. D. Patterson, Kansas City, Mo., "Pyorrhea."

Dr. E. H. Allen, Freeport, Ill., "Gold Filling."

Dr. C. C. Corbett, Edwardsville, Ill., "Approximal Gold Filling with Cement Lining."

Dr. J. K. Conroy, Belleville, Ill., "Gold Fillings, Using Non-Cohesive Gold in Gingival Third."

Dr. William Finm, Cedar Rapids, Iowa, "Gold Filling in Approximo-Occlusal Surface of an Upper Bicuspid."

Dr. F. G. Richardson, Mason City, Iowa, "Gold Filling in Approximo-Incisal of an Upper Anterior Tooth."

Dr. N. S. Hoff, Ann Arbor, Mich., "Treatment of Pyorrhea."

Dr. J. P. Buckley, Chicago, Ill., "Surgery of and Drugs Used in Pyorrhea."

Dr. M. H. Fletcher, Cincinnati, O., "Pyorrhea."

Dr. W. F. Lowrenz, St. Louis, Mo., "Gold Inlay."

Dr. F. H. Swartz, Morris, Ill., "Cast Gold Inlay."

Dr. F. W. Williard, Anna, Ill., "Gold Inlay."

Dr. W. H. Taggart, Chicago, Ill., "Cast Inlays and Bridges."

Dr. Louis E. Bake, Chicago, Ill., "Hollow Cast Inlay."

Dr. H. B. Tileston, Louisville, Ky., "Cast Gold Inlay."

Dr. L. A. King, Henderson, Ky., "Cast Gold Inlays."

Dr. Burton Lee Thorpe, St. Louis, Mo., "Gold Inlay."

Dr. L. E. Custer, Dayton, O., "Electrical Casting of Gold Inlay."

Dr. Henry Barnes, Cleveland, O., "Gold Inlay, Using Platinum and Pure Gold."

SOCIETY ANNOUNCEMENTS

Dr. F. M. Fulkerson, Sedalia, Mo., "Cast Gold Inlay, Using Hand Pressure."

Dr. L. P. Davis, Lincoln, Neb., "Veneer Gold Inlay."

Dr. Robert Seymour, Philadelphia, Pa., "Cast Gold Inlay."

Dr. Fred H. McIntosh, Bloomington, Ill., "Forming Wax for Cast Gold Work, Investing of Same and Casting."

Dr. Lee K. Stewart, Chicago, Ill., "Gold Inlay from Model."

Dr. George C. McCann, Danville, Ill., "Special Anterior Bridge Abutments and Variations of the Same for Permanent Splinting of Loose Teeth."

Dr. G. W. Schwartz, Chicago, Ill., "Splint for Loosened Teeth."

Dr. F. E. Roach, Chicago, Ill., "Cast Abutments for Bridge Work."

Dr. W. M. McCall, Louisville, Ky., "Cast Abutments for Bridges."

Dr. Max M. Eble, Louisville, Ky., "Cast Attachments for Bridges."

Dr. H. K. Kellogg, Louisville, Ky., "Cast Attachments for Bridges."

Dr. George Zederbaum, Charlotte, Mich., "Oral Prophylaxis."

Dr. C. E. Bellchamber, Effingham, Ill., "Filling of Ascher's Artificial Enamel."

Dr. C. M. Baldwin, Chicago, Ill., "Ascher's Artificial Enamel."

Dr. Burton Lee Thorpe, St. Louis, Mo., "Translux Enamel Filling."

Dr. H. H. Harrison, Wheeling, W. Va., "Ascher's Artificial Enamel."

Dr. L. H. Arnold, Chicago, Ill., "Making of an All-Carved Porcelain Jacket Crown."

Dr. F. L. Wright, Wheeling, W. Va., "Porcelain Restoration."

Dr. Alden Bush, Columbus, O., "Manipulation of Porcelain."

Dr. A. L. LeGro, Detroit, Mich., "Labial Porcelain Restoration in Anterior Teeth."

Dr. W. H. Cudworth, Milwaukee, Wis., "Porcelain Restoration."

Dr. C. I. Keely, Hamilton, O., "Cavity Preparation for Gold Inlays."

Dr. Fred W. Gethro, Chicago, Ill., "Cavity Preparation for Gold Filling."

Dr. Raymond E. Grant, Louisville, Ky., "Preparation of Cavities for Gold Inlays."

Dr. Henry Pirtle, Louisville, Ky., "Combination Fillings, Cement and Amalgam."

Dr. L. P. Bethel, Columbus, O., "Little Helps in Orthodontia."

Dr. C. L. Snyder, Freeport, Ill., "Method of Anchoring Bridges Adapted to Cases where Lower Incisors Have Been Lost Through Absorption."

Dr. George W. Haskins, Chicago, Ill., "Telescoping Attachments for Partial Dentures."

ITEMS OF INTEREST

Dr. C. J. Lyons, Jackson, Mich., "Porcelain Crowns with Cast Cap and Dowel for Badly Decayed Roots."

Dr. W. G. Bow, Louisville, Ky., "Restoration Badly Broken Down, or Fractured Roots with Porcelain Crowns."

Dr. C. E. Byington, Harrisburg, Ill., "A Time Saving Method in Constructing Shell Crowns."

Dr. Walter Dittmar, Chicago, Ill., "Technique of an Accurate Method for Making Gold Shell Crowns of Proper Contour."

Dr. L. P. Davis, Lincoln, Neb., "Gold Crowns."

Dr. Willis Coston, Topeka, Kan., "Gold and Porcelain Bridge Work."

Dr. Harry Lee, Louisville, Ky., "Bridge Work."

Dr. M. H. McMillan, Roseville, Ill., "Some Useful Methods."

Dr. E. B. Spalding, Detroit, Mich., "Splint for Teeth when Impossible to Set Posts Parallel."

Dr. William H. DeFord, Des Moines, Iowa, "Instructions in Somnoform Administration."

Dr. George W. Schwartz, Chicago, Ill., "Removable Bridge Work."

Dr. J. H. Prothero, Chicago, Ill., "Anatomic Occlusion of Artificial Teeth."

Dr. George R. Wilson, Cleveland, O., "Antagonizing Complete Artificial Dentures."

Dr. E. J. Perry, Chicago, Ill., "Anatomic Occlusion of Artificial Teeth."

Dr. Robert Canine, Louisville, Ky., "Preparations of Cast for Temporary Teeth."

Dr. Walter Dittmar, Chicago, Ill., "Exhibit of Natural Sized Models of Teeth, Tooth Dissections, Drawings and Measurements, Showing the Contour of Normal Shaped Crowns."

Pennsylvania State Board of Dental Examiners.

The Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia Fund Hall, 808 Locust Street; Pittsburg, Pittsburg Dental College, Pride and Bluff Streets, June 10-13, 1908.

For application papers or information, address,

DR. N. C. SCHAFFER, Secretary Dental Council.

Harrisburg, Pa.